ORIGINAL

0000196482

aps

Manager
State Regulation and Compliance

Mail Station 9712
PO Box 53999
Phoenix, Arizona 85072-3999
Tel 602-250-3341
Kerri.Carnes@aps.com

March 1, 2019

Docket Control
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

RE: Arizona Public Service Company's 2018 Demand Side Management (DSM) Progress Report; Docket No. E-00000U-18-0055

Pursuant to the Electric Energy Efficiency Standard Rules (EESR) and A.A.C. R14-2-2409(A):

> By March 1 of each year, an affected utility shall submit... a DSM progress report providing information on each of the affected utility's Commission-approved DSM programs....

In addition, Decision Nos. 73089, 74006, 74703, and 74813 require the DSM Progress Reports to include supplemental information. As a result, APS submits its 2018 DSM Annual Progress Report in compliance with EESR and the above-referenced decisions.

If you have any questions regarding this information, please contact me at (602) 250-3341.

Sincerely,

Kerri A. Carnes

KC/eml

c: Elijah Abinah
James Armstrong
Barbara Keene
Julie McNeely-Kirwan
Ranelle Paladino

Arizona Corporation Commission
DOCKETED
MAR 1 2019
DOCKETED BY

RECEIVED
AZ CORPORATION COMMISSION
2019 MAR -1 P 2:11

ARIZONA PUBLIC SERVICE COMPANY

2018 DEMAND SIDE MANAGEMENT ANNUAL PROGRESS REPORT

March 1, 2019

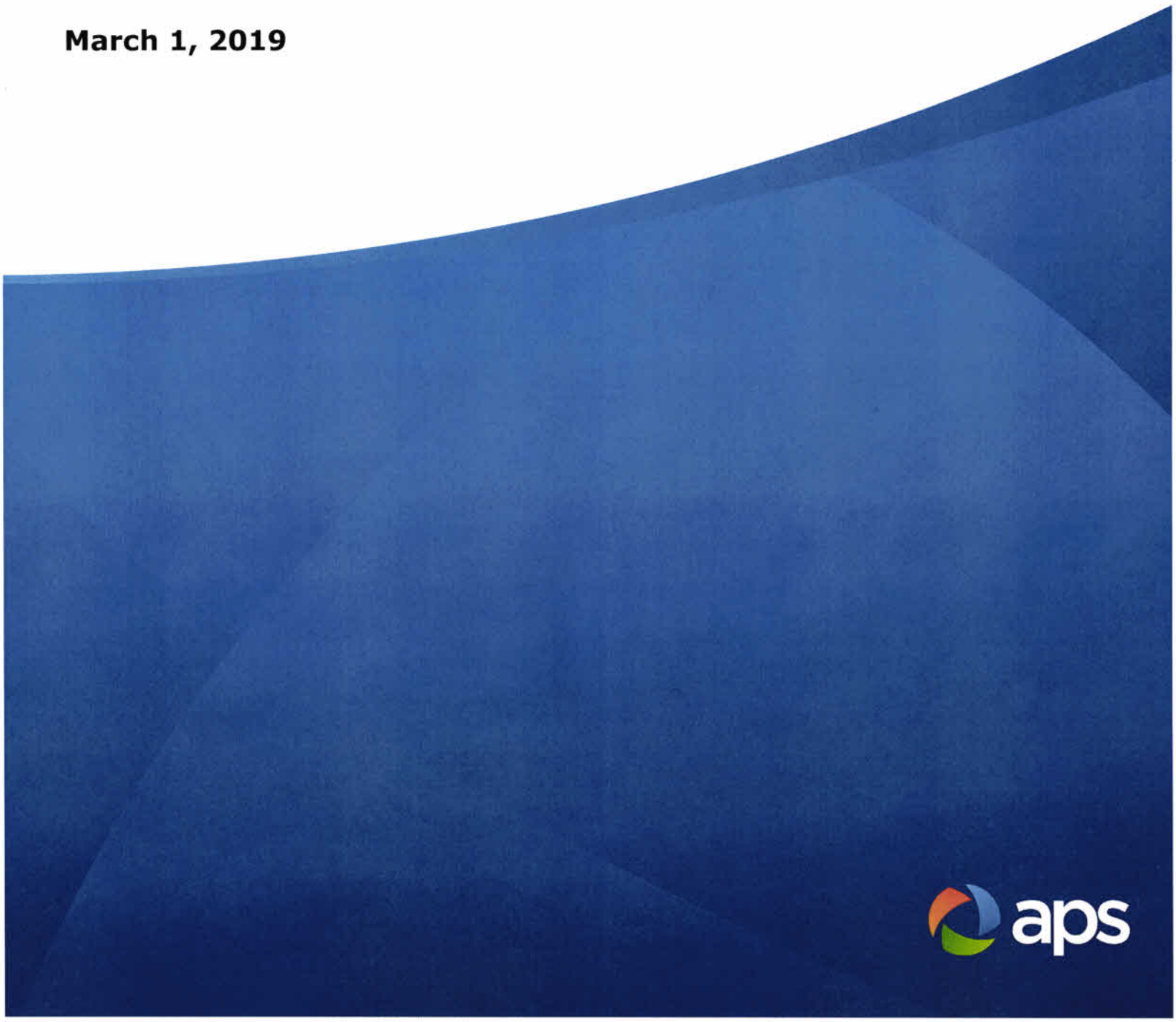

TABLE OF CONTENTS

I. Introduction

Arizona Public Service Company ("APS" or "Company") is filing this Demand Side Management Annual Progress Report ("Progress Report") for 2018 ("Reporting Period") in compliance with R14-2-2409(A) and the reporting requirements contained in Arizona Corporation Commission ("ACC" or "Commission") Decision Nos. 73089, 74406, 74703, and 74813. This report includes the following information for all APS Demand Side Management ("DSM") programs that were in place during the Reporting Period:

- APS's progress toward meeting the cumulative energy efficiency standard;
- An identification of Commission approved DSM Programs and measures by customer segment;
- A description of the findings from any research projects completed;
- A brief description of the program;
- Program goals, objectives, and savings targets;
- Level of customer participation;
- Costs incurred disaggregated by type of cost, such as administrative costs, rebates, and monitoring costs;
- A description of the results of evaluation and monitoring activities;
- kW and kWh savings;
- Environmental benefits including reduced emissions and water savings;
- Incremental benefits and net benefits in dollars;
- Performance Incentive calculations;
- Problems encountered and proposed solutions;
- A description of modifications proposed for the following year;
- If applicable, program or program measure termination and proposed date of termination;
- Where applicable, reporting requirements included in Commission Decision No. 73089, 74406, 74703, and 74813. Due to the length of Decision No. 74703 reporting requirements, this information has been included in separate work papers; and
- Other significant information.

II. 2018 DSM Program Results

A. Compliance with Energy Efficiency ("EE") Requirements

In the 2018 DSM Plan, APS forecasted estimated savings of 470,230 MWhs for the year, slightly below the compliance target of 508,893 MWhs calculated by the 'smoothed compliance' approach approved in Decision No. 75679. A summary of APS's 2018 compliance towards the the Energy Efficiency Standard is shown in Table 1. In 2018, the Company achieved 77.0% of the annual smoothed DSM goal. With the inclusion of its 2018 savings, APS has achieved cumulative megawatt hour ("MWh") savings of 4,173,079, which is 16.0% of its 2017 adjusted retail sales putting it only slightly behind the cumulative EES goal of 4,670,587 or 17.0% by 2018.

Table 1

2018 DSM Savings Goal & Achievement

Goal Calculation	
2017 Retail Sales[1]	27,474,039
2018 Cumulative EE Standard (EES)	17.00%
2018 Goal (MWh)	4,670,587
Less Cumulative Savings from 2011 through 2017[2]	3,781,057
2018 DSM Savings Goal from EES	**889,529**
Less Credit for Pre-EES Savings in 2018	226,648
Original DSM Savings Goal Less Pre-EES Credit	662,881
Levelized 2018 DSM Savings Goal based on 3-Year average of Remaining Required Savings from 2018 to 2020[3] (consistent with Decision 76313)	**508,893**
Results in MWh	
Contribution From Demand Response	109,500
Contribution From EE Programs & EE Initiatives	282,452
Total 2018 MWh Achieved	**391,952**
Over or (Under) 2018 Goal	(116,941)
% of 2018 Savings Goal Achieved	**77.0%**
Results as a % of 2017 Retail Sales	
2011 through 2017 Cumulative Savings %[3]	**13.76%**
2018 Annual Savings % of 2017 Retail Sales	**1.43%**
2018 Credit for Pre-EES Savings	**0.82%**
2018 Cumulative Savings %[4]	**16.0%**
3rd Party MER Verified MWh Savings for 2018	**392,022**
Difference: 2018 MER Verified to 2018 APR	70

Note:

[1]Includes billed and unbilled sales, does not include line losses, excludes Freeport McMoran Mine.

[2]Cumulative savings through 2017 are MER Verified MWh savings.

[3]Does not include Pre-EES Credit.

[4]Includes Pre-EES Credit.

III. Program Results and Program Incentive Calculations

Program expenses are provided in Tables 2a through 3b and DSM program megawatt ("MW") and megawatt-hour ("MWh") savings are provided in Tables 4 and 5. Tables 6 and 7 provide net benefits and Table 8 shows the performance incentive calculation. Table 9 provides the environmental benefits associated with the lifetime energy savings resulting from DSM programs. Table 10 shows demand response ("DR") load reduction and savings values.

B. Year-To-Date DSM Program Expenses

Table 2a

Demand Response Program Expenses 2018

Program	Rebates & Incentives	Measurement Evaluation and Research ("MER")	Metering	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
Marketing & MER of Rate Options	$0	$0	$0	$0	$0	$0	$0
Peak Solutions	$0	$0	$0	$1,722,189	$0	$165,317	$1,887,506
Total	**$0**	**$0**	**$0**	**$1,722,189**	**$0**	**$165,317**	**$1,887,506**

Table 2b
Energy Efficiency Program Expenses 2018

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
Residential Programs							
Consumer Products	$485,954	$0	$3,040	$1,302,317	$10,338	$273,250	$2,074,899
Existing Homes HVAC	$1,487,250	$53,638	$500	$570,826	$64,866	$268,311	$2,445,391
Existing Homes - Home Performance	$672,867	$0	$0	$297,164	$76,384	$102,313	$1,148,728
New Construction	$4,011,000	$0	$0	$524,811	$21,440	$154,511	$4,711,762
Conservation Behavior	$0	$0	$0	$229,234	$0	$183,623	$412,857
Multi-Family	$349,892	$0	$0	$697,765	$0	$118,454	$1,166,111
Limited Income	$2,936,867	$6,300	$244,960	$45,366	$20,468	$140,596	$3,394,557
Total	**$9,943,830**	**$59,938**	**$248,500**	**$3,667,483**	**$193,496**	**$1,241,058**	**$15,354,305**
Non-Residential Programs							
Large Existing Facilities	$5,311,561	$51,181	$33,559	$1,551,043	$203,723	$484,582	$7,635,649
New Construction	$1,175,015	$0	$56	$293,680	$0	$18,650	$1,487,401
Small Business	$53,196	$0	$49	$33,671	$10,195	$8,972	$106,083
Energy Information Services	$74,803	$0	$0	$116,566	$0	$0	$191,369
Schools[2]	$650,854	$0	$56	$487,489	$1,011	$16,879	$1,156,289
Total	**$7,265,429**	**$51,181**	**$33,720**	**$2,482,449**	**$214,929**	**$529,083**	**$10,576,791**
Other Initiatives							
Energy Storage & Load Mgmt-Rewards Program	$166,025	$4,542	$0	$2,351,205	$224,976	$32,920	$2,779,668
Energy and Demand Education Pilot	$0	$0	$486,886	$0	$0	$1,688	$488,574
Codes & Standards	$0	$0	$0	$8,935	$0	$0	$8,935
Total	$166,025	$4,542	$486,886	$2,360,140	$224,976	$34,608	$3,277,177
Total EE Programs	**$17,375,284**	**$115,661**	**$769,106**	**$8,510,072**	**$633,401**	**$1,804,749**	**$29,208,273**
						Measurement, Evaluation & Research	$1,816,693
						Performance Incentive[3]	$0
						Total EE Program Expense	$31,024,966
						Total DSM Expense[4,5]	**$32,912,472**

Notes:

[1]Includes the cost for the Implementation Contractor.

[2]Schools are permitted to receive funding from other Non-Residential programs. Refer to the Schools Program section for additional information regarding total funds allocated to school districts.

[3]Details of the Performance Incentive calculation are provided in Table 8.

[4]Total DSM Expense listed in Table 2b does not reflect $4,824,303 for New Rate Education spending in 2017 or 2018, as approved in Decision No. 76295

[5]Total DSM Expense listed in Table 2b includes $1,689,366 for Rewards Program Capital Expenditures included in Program Implementation.

Table 2c

2018 DSM Implementation Costs - APS Compared to Contractor[1]

Program	APS Expense	Contractor Expense	Total Implementation Cost
Residential Programs			
Consumer Products	$0	$1,302,317	$1,302,317
Existing Homes HVAC	$1,568	$569,258	$570,826
Existing Homes - Home Performance	$2,112	$295,052	$297,164
New Construction	$299,949	$224,862	$524,811
Conservation Behavior	$0	$229,234	$229,234
Multi-Family	$116,933	$580,832	$697,765
Limited Income	$846	$44,520	$45,366
Residential Total	**$421,408**	**$3,246,075**	**$3,667,483**
Non-Residential Programs			
Large Existing Facilities	$26,000	$1,525,043	$1,551,043
New Construction	$13,970	$279,710	$293,680
Small Business	$0	$33,671	$33,671
Energy Information Services	$0	$116,566	$116,566
Schools	$0	$487,489	$487,489
Non-Residential Total	**$39,970**	**$2,442,479**	**$2,482,449**
Other Initiatives			
Codes & Standards	$0	$8,935	$8,935
Energy Storage & Load Mgmt-Rewards Program	$352,967	$1,998,238	$2,351,205
Demand Response	$0	$1,722,189	$1,722,189
DSM Implementation Costs	**$814,345**	**$9,417,916**	**$10,232,261**

[1]Required by Commission Decision Nos.72060 and 73089.

C. Program–To-Date DSM Program Expenses

Table 3a

Program-To-Date Demand Response Program Expenses: January 2010 - December 2018

Program	Rebates & Incentives	Measurement Evaluation and Research	Metering	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
HEI Pilot	$596,904	$242,929	$0	$706,433	$129,123	$569,131	$2,244,520
Marketing & MER of Rate Options	$0	$0	$37,756	$147,290	$180,294	$0	$365,340
Peak Solutions	$0	$0	$51,017	$18,146,933	$0	$1,023,526	$19,221,476
Total	**$596,904**	**$242,929**	**$88,773**	**$19,000,656**	**$309,417**	**$1,592,657**	**$21,831,336**

Table 3b

Program-To-Date: Energy Efficiency Program Expenses: January 2005 - December 2018

Program	Rebates & Incentives	Training & Technical Assistance	Consumer Education	Program Implementation[1]	Program Marketing	Planning & Administration	Total Program Costs
Residential Programs							
Consumer Products	$44,666,098	$4,633	$56,375	$27,232,923	$4,569,321	$3,731,561	$80,260,911
Existing Homes HVAC	$46,985,777	$1,428,293	$1,927,270	$13,798,980	$2,384,866	$2,615,249	$69,140,435
Existing Homes - Home Performance	$15,101,924	$132,618	$34,177	$8,125,387	$1,102,307	$957,078	$25,453,491
New Construction	$32,446,385	$776,231	$130,597	$4,621,260	$3,164,040	$2,193,402	$43,331,915
Appliance Recycling	$1,445,036	$0	$0	$3,683,392	$1,147,461	$387,826	$6,663,715
Conservation Behavior	$0	$0	$0	$8,001,725	$0	$728,675	$8,730,400
Multi-Family	$4,772,450	$24,482	$101	$6,021,750	$103,152	$804,532	$11,726,467
Shade Tree	$165,813	$0	$3,837	$725,169	$19,407	$57,191	$971,417
Prepaid Energy Conservation	$0	$0	$0	$32,114	$1,744	$93,027	$126,885
Limited Income	$25,758,204	$142,856	$320,495	$974,501	$183,353	$1,433,219	$28,812,628
Total	**$171,341,687**	**$2,509,113**	**$2,472,852**	**$73,217,201**	**$12,675,651**	**$13,001,760**	**$275,218,264**
Non-Residential Programs							
Large Existing Facilities	$117,764,225	$1,922,755	$403,766	$31,570,050	$6,300,880	$4,683,921	$162,645,597
New Construction	$23,882,603	$352,588	$67,471	$8,011,520	$1,289,741	$1,013,505	$34,617,428
Small Business	$14,809,663	$277,894	$38,587	$6,279,119	$1,146,764	$725,946	$23,277,973
Building Operator Training	$0	$56,897	$0	$22,043	$15,783	$7,480	$102,203
Energy Information Services	$306,477	$26,182	$1,753	$551,370	$13,919	$29,112	$928,813
Schools[2]	$18,115,100	$345,879	$32,123	$8,470,891	$837,617	$730,200	$28,531,810
Total	**$174,878,068**	**$2,982,195**	**$543,700**	**$54,904,993**	**$9,604,704**	**$7,190,164**	**$250,103,824**
Other Initiatives							
Energy Storage and Load Mgmt-Rewards Program	$166,025	$4,542	$0	$2,351,205	$224,976	$32,920	$2,779,668
Energy and Demand Education Pilot	$0	$0	$1,220,076	$0	$0	$0	$1,220,076
Codes & Standards	$0	$0	$0	$434,146	$0	$127,302	$561,448
Total	$166,025	$4,542	$1,220,076	$2,785,351	$224,976	$160,222	$4,561,192
Total EE Program Costs	**$346,385,780**	**$5,495,850**	**$4,236,628**	**$130,907,545**	**$22,505,331**	**$20,352,146**	**$529,883,280**
						Measurement, Evaluation & Research	$22,552,030
						Performance Incentive[3]	$55,439,017
						Total EE Program Expense	**$607,874,327**
						Total DSM Expense	**$629,705,663**

Notes:

[1] Includes the cost for the Implementation Contractor.

[2] Schools are permitted to receive funding from other Non-Residential programs. Refer to the Schools Program section for additional information regarding total funds allocated to school districts.

[3] Details of the Performance Incentive calculation are provided in Table 8. The program-to-date performance incentive amount is a summation of the performance incentive amount as calculated during each previous reporting period beginning with the January through June 2005 Progress Report.

D. Year-To Date DSM Electric Savings

Table 4

DSM Electric Savings 2018[1, 3, 4]

Program	Gross Peak MW Capacity Savings	Gross Annual MWH Savings	Gross Lifetime MWH Savings[2]	Net Peak MW Capacity Savings[4]	Net Annual MWH Savings[4]	Net Lifetime MWH Savings[2, 4]
Residential Programs						
Consumer Products	4.3	13,385	123,420	4.3	13,385	123,420
Existing Homes HVAC	4.0	5,490	54,902	4.0	5,490	54,902
Existing Homes - Home Performance	5.1	10,381	83,779	5.1	10,381	83,779
New Construction	5.7	11,593	231,855	5.7	11,593	231,855
Conservation Behavior	24.7	40,574	40,574	24.7	40,574	40,574
Multi-Family	0.8	4,623	72,375	0.8	4,623	72,375
Limited Income	0.2	1,194	21,497	0.2	1,194	21,497
Total	**44.8**	**87,240**	**628,402**	**44.8**	**87,240**	**628,402**
Non-Residential Programs						
Large Existing Facilities	19.2	108,311	1,671,004	19.2	108,311	1,671,004
New Construction	2.7	15,968	239,434	2.7	15,968	239,434
Small Business	0.4	1,620	15,154	0.4	1,620	15,154
Energy Information Services	5.5	5,327	26,636	5.5	5,327	26,636
Schools[2]	2.8	10,425	169,049	2.8	10,425	169,049
Total	**30.6**	**141,651**	**2,121,277**	**30.6**	**141,651**	**2,121,277**
Energy Storage and Load Mgmt-Rewards Program	6.0	26,327	70,212	6.0	26,327	70,212
Energy and Demand Education Pilot	-	-	-	-	-	-
Codes & Standards	6.3	22,050	239,861	6.3	22,050	239,861
System Savings	-	5,184	5,184	0	5,184	5,184
DR Contribution	25.0	109,500	109,500	25.0	109,500	109,500
Total DSM Savings	**112.7**	**391,952**	**3,174,436**	**112.7**	**391,952**	**3,174,436**

Notes:

[1]Savings for 2008 and after are MER adjusted, per Decision No. 69663, and savings prior to 2008 are not MER adjusted.

[2]Refers to savings over the expected lifetime of all program measures.

[3]Savings are adjusted for line losses (energy 7.2%, demand 11.7%) and a capacity reserve factor of 15%.

[4]Based on 2010 MER net to gross ratio ("NTGR") analysis, APS is utilizing a NTGR of 1.0 for all DSM programs and measures.

E. Program-To-Date DSM Electric Savings

Table 5

Program-To-Date DSM Electric Savings: January 2005 - December 2018[1, 3]

Program	Gross Peak MW Capacity Savings	Gross Annual MWH Savings	Gross Lifetime MWH Savings[2]	Capacity Savings[4]	Net Annual MWH Savings[4]	Net Lifetime MWH Savings[2, 4]
Residential Programs						
Consumer Products	191.1	1,573,814	11,453,409	172.7	1,427,721	10,620,000
Existing Homes HVAC	117.2	167,873	2,164,673	106.9	157,143	2,004,747
Existing Homes - Home Performance	32.3	59,443	716,819	32.1	59,038	712,362
New Construction	63.1	123,866	2,477,309	62.2	121,862	2,437,223
Appliance Recycling	4.0	66,195	397,166	9.2	60,756	364,532
Conservation Behavior	75.1	306,084	306,084	75.1	306,084	306,084
Multi-Family	7.3	58,123	695,700	7.3	58,123	695,700
Shade Tree	1.1	2,005	60,114	1.1	2,005	60,114
Prepaid Energy Conservation	0.6	3,172	3,172	0.6	3,172	3,172
Limited Income	2.8	18,106	326,515	2.8	18,106	326,515
Total	**494.6**	**2,378,681**	**18,600,961**	**470.0**	**2,214,010**	**17,530,449**
Non-Residential Programs						
Large Existing Facilities	277.7	1,630,686	22,111,867	272.4	1,584,471	21,477,911
New Construction	53.2	369,674	5,461,796	50.6	334,313	4,958,016
Small Business	35.4	163,694	2,171,338	34.7	159,548	2,114,027
Building Operator Training	0.2	1,001	12,447	0.1	701	8,713
Energy Information Services	19.1	10,961	82,547	19.1	10,961	82,547
Schools	34.8	163,977	2,355,919	33.9	158,689	2,275,790
Total	**420.3**	**2,339,993**	**32,195,914**	**410.7**	**2,248,683**	**30,917,004**
Energy Storage & Load Mgmt-Rewards Program	6.0	26,327	70,212	6.0	26,327	70,212
Energy and Demand Education Pilot	-	-	-	-	-	-
Codes & Standards	50.7	205,506	2,007,479	10.7	205,506	2,007,479
System Savings	0.1	18,665	31,874	0.1	18,665	31,874
DR Contribution		552,417			552,417	
Total	**56.8**	**802,915**	**2,109,565**	**16.8**	**802,915**	**2,109,565**
Total DSM Savings	**971.8**	**5,521,589**	**52,906,440**	**897.5**	**5,265,608**	**50,557,018**

Notes:

[1] Savings for 2008 and after are MER adjusted, per Decision No. 69663, and savings prior to 2008 are not MER adjusted.

[2] Refers to savings over the expected lifetime of all program measures.

[3] Savings are adjusted for line losses (energy 7.2%, demand 11.7%) and a capacity reserve factor of 15%.

[4] Based on 2010 MER Net to Gross Ratio ("NTGR") analysis, APS is utilizing a NTGR of 1.0 for all DSM programs and measures.

F. Year-To-Date Energy Efficiency Societal Benefits

Table 6

Energy Efficiency Societal Benefits 2018

Program	Program Cost	Societal Benefits	Societal Cost	Net Benefits	Benefit/Cost Ratio
Residential Programs					
Consumer Products	$2,074,899	3,137,550	3,089,593	$ 47,957	1.02
Existing Homes HVAC	$2,445,391	$ 2,344,642	$ 2,438,147	$ (93,505)	0.96
Existing Homes - Home Performance	$1,148,728	$ 2,304,797	$ 2,300,309	$ 4,488	1.00
New Construction	$4,711,762	9,487,961	$8,089,196	$ 1,398,765	1.17
Conservation Behavior	$412,857	$768,387	$412,857	$ 355,530	1.86
Multi-Family	$1,166,111	1,613,381	$1,514,867	$ 98,514	1.07
Limited Income[1]	$3,394,557	$ 402,498	$ 402,498	$ -	1.00
Total	**$ 15,354,305**	**$ 20,059,216**	**$ 18,247,467**	**$ 1,811,749**	**1.10**
Non-Residential Programs					
Large Existing Facilities	$7,635,649	$54,241,588	$37,388,215	$16,853,373	1.45
New Construction	$1,487,401	$6,925,733	$3,654,613	$3,271,120	1.90
Small Business	$106,083	$465,796	$336,218	$129,578	1.39
Energy Information Services	$191,369	828,119	349,479	$478,640	2.37
Schools	$1,156,289	$6,100,629	$4,466,370	$1,634,259	1.37
Total	**$10,576,791**	**$68,561,865**	**$46,194,895**	**$22,366,970**	**1.48**
Energy Storage & Load Mgmt-Rewards P	$2,779,668	$1,977,224	$1,864,842	$112,382	1.06
Energy and Demand Education Pilot	$488,574	$0	$488,574	-$488,574	-
Codes & Standards	$8,935	$ 6,059,570	$ 45,823	$6,013,747	132.24
Measurement, Evaluation & Research	$1,816,693	$0	$1,816,693	-$1,816,693	-
Performance Incentive	$0	$0	$0	$0	
Total	$5,093,870	$8,036,794	$4,215,932	$3,820,862	1.91
Total Energy Efficiency Societal Benefits	**$31,024,966**	**$96,657,875**	**$68,658,294**	**$27,999,581**	**1.41**

Notes:

[1]APS analysis is consistent with Decision No. 68647. Program Costs include weatherization and bill assistance. Societal Costs do not include bill assistance because it does not contribute to electric savings.

G. Program-To-Date EE Societal Benefits

Table 7

Program-To-Date Energy Efficiency Societal Benefits: January 2005 - December 2018

Program	Program Cost	Societal Benefits	Societal Cost	Net Benefits
Residential Programs				
Consumer Products	$80,260,911	$475,766,337	$147,923,261	$327,843,076
Existing Homes HVAC	$69,140,436	$134,338,486	$97,058,793	$37,279,693
Existing Homes - Home Performance	$24,544,758	$50,158,377	$41,418,464	$8,739,914
New Construction	$43,331,915	$139,892,377	$77,907,419	$61,984,958
Appliance Recycling	$6,741,931	$17,548,709	$5,222,843	$12,325,866
Conservation Behavior	$8,730,400	$8,876,653	$8,325,053	$551,600
Multi-Family	$11,726,468	$26,848,236	$16,182,714	$10,665,522
Shade Tree	$970,668	$4,512,595	$2,357,226	$2,155,369
Prepaid Energy Conservation	$126,885	$96,059	$122,220	-$26,161
Limited Income[1, 2]	$28,812,629	$23,784,458	$23,784,458	$0
Total	**$274,387,001**	**$881,822,287**	**$420,302,451**	**$461,519,836**
Non-Residential Programs				
Large Existing Facilities	$162,645,597	$829,549,355	$411,261,750	$418,287,605
New Construction	$34,617,428	$201,623,681	$74,398,623	$127,225,058
Small Business	$23,277,973	$104,016,054	$36,367,201	$67,648,853
Building Operator Training	$102,203	$424,302	$183,392	$240,910
Energy Information Services	$928,811	$4,813,777	$1,527,966	$3,285,811
Schools2	$28,531,810	$98,937,100	$60,187,436	$38,749,664
Total	**$250,103,822**	**$1,239,364,269**	**$583,926,368**	**$655,437,901**
Energy Storage & Load Mgmt-Rewards Program	$2,779,668	$1,977,224	$1,864,842	$112,382
Energy and Demand Education Pilot	$1,219,664	$0	$1,219,664	-$1,219,664
Codes & Standards	$561,448	$70,956,792	$30,688,663	$40,268,129
Measurement, Evaluation & Research	$22,552,030	$0	$22,552,030	-$22,552,030
Performance Incentive	$ 55,429,631	$0	$55,429,631	-$55,429,631
Total Energy Efficiency Societal Benefits	**$607,033,264**	**$2,194,120,572**	**$1,115,983,649**	**$1,078,136,923**

Notes:

[1]Program Costs include weatherization and bill assistance. Societal Costs do not include bill assistance because it does not contribute to electric savings.

[2]APS analysis is consistent with Decision No. 68647.

H. 2018 Performance Incentive Calculation

APS has provided a calculation of the Performance Incentive in Table 8 below. This is shown for compliance reporting purposes only. APS did not request a Performance Incentive in the 2018 DSM Implementation Plan.

Table 8
2018 Performance Incentive

Achievement Relative to Performance Incentive Level	
Total MWh Saved in 2018	391,952
Less System Savings	5,184
Total MWh Saved less System Savings	**386,768**
Total MWh Saved less System Savings as % of 2018 Goal	**76.8%**

Achievement Relative to DSM Goal	Performance Incentive as % of Net Benefits	Performance Incentive Capped at No More Than $0.0125 per kWh saved
< 85%	0%	255,218,000 kWh x $0.0125
Net Benefits (Prior to PI, Codes & Standards, and System Savings)	$21,873,452	
Calculation of Performance Incentive	$0	$3,190,225
Performance Incentive[1] Amount for 2018 (Min. of % of Net Benefits or Capped amount at $0.0125 per kWh)	**$0**	

Notes:

[1]The Performance Incentive methodology/calculation was approved in Decision No. 69663 and was modified in Decision No. 71448 and Decision No. 74406.

I. Net Environmental Benefits

Table 9

2018 Net Environmental Benefits[1,2]

Reporting Period	Water (Mil Gal)	SOx (Lbs)	NOx (Lbs)	CO2 (Mil Lbs)	PM10 (Lbs)
Year-to-Date: Jan - Dec	1,006	14,126	268,399	2,854	78,409
Program-to-Date: Since Jan 2005	16,027	224,979	4,274,596	45,451	1,248,758

Notes:

[1]The environmental reductions are based on the net energy savings of all program measures installed during the Reporting Period over their expected lifetimes.

[2]Some measures will result in customer water savings, which this calculation does not include. Only utility water savings are included in this calculation.

J. Demand Response Load Reduction and Energy Savings

Table 10

Demand Response Program

Load Reduction and Energy Savings 2018

Program/Initiative	Load Reduction (MW)	Energy Savings (MWh)[1]
APS Peak Solutions	25.0	109,500
Critical Peak Pricing	0.4	1,700
Time of Use Rates & Super Peak	164.4	720,072
Total	189.8	831,272

Demand Response Counted Towards the EES	**109,500**

Notes:

[1]Energy Savings (MWh) = Load reduction (MW) X (8,760/2) hours which is a 50% load factor.

K. Supplemental Charts

Table 11

DSM Funds Billed by Customer Class: January - December 2018

	DSM Funds Collected by Class ($000)*
Residential	$ 12,684
Commercial	$ 11,824
Industrial	$ 1,736
Irrigation	$ 19
Streetlights	$ 124
Other Public Authority	$ 2
Total DSM Funds	$ 26,389

* Does not include $20.0 million collected in base rates through the system benefits charge in 2018. The ACC increased the portion of DSM funding in base rate collections from $10 million to $20 million in Decision No. 76295, Exhibit A, Section VIII, Appendix D as a result of APS' Rate Case Settlement Agreement.

Table 12

Retail Sales by Customer Class: January - December 2018

Retail Sales	Year End 2018
Residential	13,190,481
Commercial	12,388,412
Industrial	2,213,873
Irrigation	10,395
Hwy Lighting & Other Public Authority	140,225
Total Retail Sales (MWhs)	27,943,386

Table 13

EE Savings for the Following Rate Schedules: January - December 2018

Rate Schedule	MW Savings	Annual MWh Savings	Lifetime MWh Savings
E-32 L	6.9	33,466	477,735
E-32 TOU	1.6	9,474	102,207
E-34	1.0	4,045	56,162
E-35	1.0	6,061	82,790
E36 XL	0.0	0	0
GS on E-30	1.4	14,598	291,951
Lighting Services	1.5	15,822	308,334

Note: this table contains a subset of all non-residential rates, therefore the totals do not match Table 4.

Terms and Definitions Used in Tables 1-13

Consumer Education: Funds allocated to support general consumer education about EE improvements and programs.
Free-riders: Program participants who would have installed the energy-efficient DSM measures anyway, even if the program were not in operation.
Gross Savings: Demand and energy savings related to the DSM programs prior to accounting for reductions for free riders and additions for spillover.
Measurement, Evaluation & Research ("MER"): Activities that will identify current baseline energy efficiency levels and the market potential of DSM measures, perform process evaluations, verify that energy-efficient measures are installed, track savings, and identify additional EE research.
Net Savings: Demand and energy savings related to the DSM programs after accounting for reductions for free-riders and additions for spillover.
Performance Incentive: Percentage share of DSM net economic benefits (benefits minus costs), capped at a percent of total DSM expenditures, depending on the percent of MWh savings goal achieved.
Planning and Administration: APS's costs to plan, develop and administer programs including management of program budgets, oversight of the RFP process and implementation contractor, program development, program coordination and general overhead expenses.
Program Implementation: Program delivery costs associated with implementing the program including implementation contract labor and overhead costs, as well as other direct program delivery costs.
Program Marketing: Expenses related to program marketing and increasing DSM consumer awareness (direct program marketing costs as opposed to general consumer education).
Rebates and Incentives: Money allocated for customer rebates and incentives, installation of low income weatherization and low income bill assistance.
Spillover: Refers to indirect energy impacts of the program and estimated savings from customers who implement energy-efficient savings strategies as a result of knowledge of APS's program but who do not receive an incentive through the program.
Training and Technical Assistance: Cost of EE training and technical assistance.

IV. Residential Energy Efficiency Programs

1. Consumer Products Program

Description

The Consumer Products Program is made up of three program elements – Residential Smart Thermostats, Residential Pool Pumps, and Residential Lighting. The Smart Thermostat program element is designed to encourage customer adoption of this new technology. A $30 rebate is being made available for each thermostat purchased through retail channels and/or installed by HVAC or home performance contractors. Rebates are paid directly to customers who have their eligible thermostat(s) successfully installed and registered with the smart thermostat manufacturer and have completed an online application.

The Residential Pool Pump element of the program was terminated effective January 1st, 2018 but continued rebate fulfillment through the beginning of the year for applications submitted late in 2017. The program offered a $50 rebate for installation and optimal calibration of energy-efficient, variable speed pool pumps.

The Residential Lighting element of the program provides high-efficiency ENERGY STAR® Light Emitting Diodes ("LEDs") to APS customers at community outreach events and community serving events. LEDs use up to 90% less energy than standard incandescent bulbs and last up to twenty-five times longer, typically saving consumers –up to $80 in energy costs over the life of each 60 Watt equivalent LED bulb.

Program Goals, Objectives and Savings Target

The goal of the Smart Thermostat program element is to promote the purchase of smart thermostats that provide energy efficiency and peak demand savings for the leading energy consuming system in a residential home – air conditioning. In addition to their significant energy savings features, smart thermostats also offer capabilities for demand response and load management.

Table 14 - Consumer Products Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
5.8	18,016	144,321

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

During this Reporting Period, the energy-efficient lighting element of the program resulted in the distribution of 62,100 LEDs through community outreach events. In 2018, approximately 155 different events from home & garden shows to community assistance events received LEDs. Events receiving LEDs during this reporting period included: Maricopa County Home & Garden Show, Yuma Home & Garden Show, St. Vincent DePaul, Keep Phoenix Beautiful Earth Day, Native American Games, and Arizona League of Cities and Towns.

The Pool Pump element provided rebates for 368 variable-speed pool pumps purchased by customers during the late 2017 reporting period who were still eligible for rebate fulfillment in the 2018 reporting period.

The Smart Thermostat element provided rebates for 6,965 devices purchased by customers during the 2018 reporting period. The measure currently offers customers the option of eight different manufacturer's thermostats and over 34 different models - the market leaders included are Nest, Ecobee and Honeywell.

Evaluation/Monitoring Activities and Research Results

- Initiated AMI data billing analysis using a matched control group to determine hourly energy and demand impacts from smart thermostats.
- Verified the accuracy of AMI data through a comparison with whole home interval data collected through the Residential Load Study.
- Held quarterly meetings with APS program managers and implementers to review MER findings, identify research needs, and discuss data needs and constraints relevant to impact assessment for smart thermostat measure offerings.
- Simulated behavior changes for migration to time-of-use and demand-based rates enabled by smart thermostats. Building energy models reflected shifts in energy consumption form on peak periods (3-8pm, weekdays) to off peak periods.
- Continued to review and update residential lighting and smart thermostat Measure Analysis Spreadsheets and Analytic Databases.
- Performed a comprehensive review of the smart thermostat interval data available through the implementation contractor's online portal. The review identified gaps and anomalies in the data for the MER team to consider in future analyses.

Consumer Education and Outreach

APS purchased a supply of LEDs to use for the low income program and for customer education and awareness building purposes. APS supported 155 community education and customer outreach events during this reporting period to promote the Consumer Products programs and educate customers about other APS programs, rebates, and opportunities for saving energy and money. For a comprehensive list of events and dates, please refer to the work-papers provided to ACC Staff.

Advertising and article placements for the Consumer Products Program included the following:

- Produced newsletter articles for Smart Thermostat program education for the February and August newsletters;
- Conducted 736 store visits where 315 big-box retail associates and pool professionalswere trained on APS modern rates and ways to help customers 'shift, stagger and save' on peak energy;
- Provided program brochures for consumers at outreach events;
- Maintained program web pages on aps.com including basic information, online application forms, video content, and answers to frequently asked questions.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

In accordance with ACC Decision No. 76313, APS eliminated incentives for variable speed pool pumps and retail LEDs effective on January 1, 2018.

Other Significant Information

No other significant information to report.

MER Adjusted Gross kW and kWh Savings

Table 15 - MER Adjusted Gross MW and MWh Savings - Consumer Products Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Giveaway LEDs	58,808	2,818	64,818	0.4
2017 In-Service LEDs	NA	2,248	2,394	0.3
2017 In-Service CFLs	NA	3,178	3,385	0.4
Smart Thermostats	6,965	4,436	44,360	3.2
Variable Speed Pool Pumps	368	705	8,463	0.0
TOTAL	**66,141**	**13,385**	**123,420**	4.3

Please refer to workpapers for the complete list of units in this reporting period. In service units refer to bulbs distributed

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

2. Residential New Home Construction

Description

This program promotes high-efficiency construction practices for new homes. It offers incentives to builders that meet the program's Energy Efficiency standards. The program emphasizes the whole building approach to improving Energy Efficiency and includes field testing of homes to ensure performance. Participating builders are trained to apply building science principles to assure that high efficiency homes also have superior comfort and performance. The program also provides education for prospective homebuyers about the benefits of choosing an energy-efficient home and the features to consider.

The program takes advantage of the national ENERGY STAR® brand name, and promotes the U.S. Environmental Protection Agency ("EPA") ENERGY STAR® label to prospective homebuyers.

Program Goals, Objectives and Savings Targets

The program objective is to increase the penetration of homes built to high-efficiency standards. The rationale for this program is that residential new construction in the APS service territory, particularly the Phoenix metro area, has historically been one of the biggest drivers of APS's system load growth. It is more cost-effective to work with builders to implement efficient building practices at the time of construction rather than to attempt to retrofit efficiency after a home has been built. For many new home measures, such as building envelope improvements, the benefits of efficiency upgrades will be sustained for the life of the home to produce cost-effective savings.

Table 16 - Residential New Construction Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
10.1	20,271	405,426

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

During this Reporting Period, there were 53 homebuilders and 258 subdivisions actively participating in the program. The program currently includes ENERGY STAR® communities throughout the APS service territory including the Phoenix metro area, Yuma, Casa Grande, Florence, Prescott, Verde Valley, and Flagstaff.

Specifically, in 2018 APS paid builder incentives for the following completed homes:

- 2,420 ENERGY STAR® Version 3
- 2,358 ENERGY STAR® Version 3 – HERS 60

Evaluation/Monitoring Activities and Research Results

- Continued to review and update RNC measure analysis spreadsheets and analytic database for Energy Star® Homes V3.0.
- Continued to support data requirements of implementation tracking system to meet evaluation needs.

Consumer Education and Outreach

Program marketing and education efforts during this reporting period include the following:

- *2018 Homebuilders Association Member Directory* - print ad to promote the APS ENERGY STAR® Home program to builders
- *Southwest Builders Show (An event hosted by HBACA)* – APS sponsored the Forecast Luncheon, where the lead economist, Elliott D. Pollack, and featured builders provided attendees an outlook on what they see coming up in 2018 and beyond in the real estate business.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No program modifications were made during this reporting period.

Other Significant Information

In October, APS participated in the Southwest Builder Show trade expo, hosted by the Home Builder Association of Central Arizona, and met with builders, HERS raters, and other industry partners.

MER Adjusted Gross kW and kWh Savings

Table 17 - MER Adjusted Gross MW and MWh Savings - Residential New Construction Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
APS ENERGY STAR Homes V3	2,420	3,834	76,678	1.9
APS ENERGY STAR Homes HERS60	2,358	7,759	155,177	3.8
TOTAL	**4,778**	**11,593**	**231,855**	**5.7**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2b and 2c. In 2018, $212,000 was shifted from the Residential New Homes program to the Conservation Behavioral program during this reporting period.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

3. Residential Existing Homes Heating, Ventilation, and Air Conditioning Program

Description

The Residential Existing Homes Heating, Ventilation, and Air Conditioning Program ("Residential HVAC") uses a combination of financial incentives, contractor training and consumer education to promote the proper installation and maintenance of energy-efficient HVAC systems.

The AC Rebate with Quality Installation ("QI") measure offers incentives to homeowners for buying energy efficient HVAC equipment that is installed in such a manner that it meets the program requirements for air flow, refrigerant charge and sizing. The main components of this measure are the correction of the refrigeration charge, leak repair, condenser coil cleaning and air flow verification.

In addition to incentives, the Residential HVAC program provides APS customers with referrals to contractors who meet strict program requirements for professional standards, technician training, and customer satisfaction.

Program Goals, Objectives and Savings Targets

The Existing Homes HVAC program uses a combination of financial incentives, contractor training and consumer education to promote high-efficiency HVAC systems. The program focuses on the proper installation of equipment, increasing existing equipment efficiency, and the testing, sealing and repair of duct work in existing Residential homes.

Table 18 - Existing Homes HVAC Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
7.0	8,544	85,440

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

- A total of 4,729 AC rebates were paid through the HVAC element of the program in 2018.
- There are currently 138 contractors that can offer the APS AC Rebate of which 119 are APS Qualified Contractors. There are 19 Rebate Eligible contractors that entered the program through the application process approved by the ACC in October 2009, which does not require membership in the Arizona Heat Pump Council.

Evaluation and Monitoring Activities and Research Results

- Initiated the Baseline Energy Metering (BEM) study to install residential end-use metering equipment at 50 homes in the Phoenix metro area. The equipment records one-minute electric energy consumption data for all end-uses in the home including, HVAC, pool pumps, hot water, solar photovoltaic and other appliances on dedicated circuits. This is combined with data from the Residential Load Study (RLS) that metered an additional 47 homes from summer 2017 to summer 2018 to understand energy use patterns and variations for APS residential customers.
- Continued to review and update Residential HVAC measure analysis spreadsheets and analytic database including Quality Installation.

Consumer Education and Outreach

APS included consumer education about HVAC savings in consumer newsletters, E-News, online at aps.com, and social media – including information about ways to save on heating/cooling costs with TOU/demand based rates by pre-cooling prior to the on-peak period. In addition, participating HVAC contractors market the program directly to their customers.

Problems Encountered and Proposed Solutions

The Residential HVAC program had an estimated benefit/cost ratio of 0.96 during this reporting period. Proposed solutions to improve cost effectiveness include increasing program requirements to a minimum of 16 SEER (which will help increase savings per unit for the HVAC Quality Install measure), adding 'leave behind' smart thermostats as a new measure in the program (which will increase overall program savings and benefits), and combining the Residential HVAC, Home Performance and Consumer Products into one combined Existing Homes program. These solutions have been proposed in the APS 2018 and 2019 DSM Implementation Plans. No further changes are proposed at this time.

Program Modifications/Terminations

On January 1st 2018, the Duct Test and Repair, and Western Cooling Control measures were removed from the Residential HVAC program and became exclusively offered through the Home Performance program, where these measures will be offered based on applicability to the home as determined by the test results of an on-site energy audit. This will improve the overall performance and cost effectiveness of these measures.

MER Adjusted Gross kW and kWh Savings

Table 19 - MER Adjusted Gross MW and MWh Savings - Existing Homes HVAC Program

Measure	# Units	Annual Gross MWh Savings*	Lifetime Gross MWh Savings*	MW Peak Demand Savings
AC with Quality Installation	3,957	5,490	54,902	4.0
TOTAL	**3,957**	**5,490**	**54,902**	**4.0**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

4. Home Performance with ENERGY STAR®

Description

The Home Performance with ENERGY STAR® ('Home Performance or HPwES') program promotes a whole house approach to energy efficiency by offering incentives for improvements to the building envelope and mechanical systems of existing homes within the APS service territory. HPwES includes measures that improve the efficiency of the home with air sealing, insulation and duct sealing.

The program offers home owners a comprehensive home energy checkup for as low as $99 that identifies ways to improve energy efficiency and comfort throughout the home. This program element offers a direct install feature that includes 5 LED's and one low-flow showerhead that are installed at the time of the checkup. Additional financial incentives are available for duct sealing, the Western Cooling Control Device, and insulation once a home owner has completed an HPwES checkup. After measures are installed, rigorous testing and quality assurance protocols verify installation quality and performance. The program also includes the Energy Analyzer which offers residential customers a free on-line energy audit tool that provides home energy efficiency recommendations customized for their home and lifestyle, including savings tips and behavioral savings opportunities that participants can pledge to complete.

Program Goals, Objectives and Savings Targets

The HPwES measures promote a whole house approach to efficiency by offering education, technical assistance and financial incentives for improvements to the building envelope of existing homes within the APS service territory.

Table 20 - Existing Homes - Home Performance Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
5.0	10,099	76,723

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

During this Reporting Period:

- A total of 1,930 ENERGY STAR® approved Energy Audits were completed in 2018. Each home also received a direct install bag containing one low-flow showerhead and five 9-watt LED light bulbs.
- The APS HPwES program paid either rebates, or supplied direct installed measures for these 1,930 participating homes. Approximately 50% of homes that completed an audit during the reporting period took steps to install additional measures as a result of the audit. The total number of customer rebates paid was 2,487. Specifically, APS has paid:
  - 1,486 duct sealing and repair rebates;
  - 823 insulation only rebates;
  - 178 Western Cooling Control Device rebates.

- There are currently 35 qualified HPwES contractors. Contractors must complete the Building Performance Institute's Building Analyst certification and undergo a mentorship prior to becoming active. HPwES currently serves Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, Yavapai, and Yuma counties. We continue to promote contractor participation in underserved areas to provide options for customers.

- During this reporting period, the APS Home Performance answer line received 561 referral inquires by telephone.

- During 2018 the Energy Analyzer received 44,500 verified customers that logged in and completed the survey.

Evaluation/Monitoring Activities and Research Results

- Initiated the Baseline Energy Metering (BEM) study to install residential end-use metering equipment at an additional 50 homes in the Phoenix metro area. The equipment records one-minute electric energy consumption data for all end-uses in the home including, HVAC, pool pumps, hot water, solar photovoltaic and other appliances on dedicated circuits. This is combined with data from the Residential Load Study (RLS) that metered an additional 47 homes from summer 2017 to summer 2018 to understand the variation in energy use for APS residential customers.

- Simulated the hourly energy and demand impacts for five configurations of water heater timer control strategies and five typical baseline consumption profiles based on the metering data collected from the BEM and RLS studies. The simulations provided the optimal control strategy to satisfy water heater loads while maximizing customer bill savings for water heater timers used in conjunction with time-of-use and demand-based rates.

- Continued review of program tracking data bases and provided guidance on structuring data exports of participant audit data containing building characteristics, including insulation levels, blower door test results, window types, HVAC system type and efficiency, to support annual savings analysis and verification process.

- Continued to review and update program measure analysis spreadsheets and the analytic database for behavioral, envelope, duct sealing, smart thermostat, and western cooling control program measures.

Consumer Education and Outreach

HPwES marketing and consumer/contractor education efforts for this reporting period include:

- Continued to utilize the Energy Analyzer online audit tool on aps.com and social media channels as a lead generator for the HPwES program. Educated customers on how their home uses energy and what energy efficiency program recommendations are available to them. When customers receive a recommendation to consider an on-site energy audit, customers can apply immediately from the results page to enter into the HPwES program and receive contractor referrals.

- Completed an update to the Energy Analzyer tool that improves customer experience and increases the value of the program's energy savings tips. The updated tool includes Interval data, mobile device optimization, better user experience, and more customized tips to help customers save through efficiency and shifting energy usage out of on-peak periods.

- APS provides customers with a simple, streamlined process to help guide them through potential energy improvement projects - including a "My Project" dashboard that helps track their project status, review program documents and receive digital coaching throughout their program participation.
- Employed search engine marketing (SEM) and digital ads to better target customers actively searching for ways to improve their energy efficiency.
- Continued with a "hometown" concept for homeowners that match them with one contractor whose service area includes their neighborhood. This feature was designed to eliminate confusion for customers looking at an entire list of contractors. The new referral tool now captures the contractors' bio, website link, BBB profile and logo for a more thorough description.
- Distributed HPwES brochures through community events, trade allies, contractors, and other industry partners.
- Maintained the aps.com/checkup program page and continued to make it more customer friendly. A stand-alone website is available at www.azhomeperformance.com.
- Placed articles in the APS newsletter and e-newsletter for several months throughout the year for both Home Performance and Energy Analyzer.
- Delivered presentations to several real estate and lender groups on the benefits of adding Home Performance into the sale of an existing home, and the value of the new Home Performance with ENERGY STAR® Certificate of Energy Improvements which is provided to participating homeowners who complete energy efficiency home upgrades through the program.
- The APS Home Performance program continues to be highlighted at the national level for its high level of quality work and customer service. Two members of our trade ally pool have won the National EPA/ENERGY STAR® Contractor of the year award. One of them for the third consecutive year. Only 6 of these are awarded nationally.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

On January 1st, Duct Test and Repair and the Western Cooling Control measures became exclusively offered through the HPwES program.

Other Significant Information

The Home Performance with ENERGY STAR® program is a valuable program to assist residential customers in improving the energy efficiency of their homes and in supporting a local network of home performance contractors who can help deliver efficiency services. The program is a driver for customers to participate in other energy efficiency programs and often an entry point with APS when trying to diagnose high bill concerns or comfort problems inside their home. By channeling customers into the program, we are able to provide important services and education to help rate payers manage their bill and provide solutions. In addition to electric energy savings the program also generates significant additional savings for customers such as health and safety and indoor air quality.

APS works closely with other utilities in the state to coordinate the delivery of HPwES statewide. In 2018, APS continued to work closely with Salt River Project as we coordinated program implementation to optimize delivery across both electric service territories. This

coordination allowed us to further ensure market consistency, while enhancing the customer experience through a joint program delivery.

MER Adjusted Gross kW and kWh Savings

Table 21 - MER Adjusted Gross MW and MWh Savings - Existing Homes - Home Performance

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Online Audits	44,500	6,670	6,670	3.4
Low Flow Showerheads	1,930	145	1,455	0.0
Cool Control	178	115	924	0.1
Duct Repair	1,486	1,404	25,264	1.0
Direct install LED	9,650	569	12,523	0.1
Insulation Weighted	823	1,478	36,943	0.5
TOTAL	**58,567**	**10,381**	**83,779**	**5.1**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

In addition to the savings shown above, HPwES conducts a number of market transformation efforts, such as contractor training and customer education activities designed to transform the EE market. This results in spillover which produces additional energy savings and net benefits which are not quantified here.

5. Residential Conservation Behavior Program

Description

This Residential Conservation Behavior Program consists of Home Energy Reports that provide energy education for participating customers through regularly executed printed or digital reports. These personalized reports are designed to motivate a measureable savings in energy usage. To drive conservation behavior, the Home Energy Reports compare participant usage with similar or "neighbor" homes and provide customized tips for reducing or shifting energy usage.

Based on best practices in behavioral science research, the report format compares participants' energy use to what is a typical home for their profile and provides a benchmark for participants. This has proven to be an effective way to achieve and sustain behavior changes. Customers can "opt out" of the program at any time.

Program Goals, Objectives, and Savings Targets

The goal of this Program is to motivate participants to change their behavior and conserve their home energy usage. Results for Peak Demand (MW), Annual Energy Savings (MWh) and Lifetime Energy Savings (MWh) are projected, measured and reported.

Table 22 - Conservation Behavior Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
8.0	15,732	15,732

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

The Home Energy Reports program was restarted in 2018 after a pause to the program due to the transition to the new customer billing system and customer rate migration activities. Starting in November 2018, printed reports were sent to 80,000 customers along with an email version of the report. These customers will continue to receive quarterly printed and email reports during 2019. An additional 100,000 customers were sent an email-only report (no printed reports). These customers will continue to receive monthly email reports during 2019.

Evaluation/Monitoring Activities and Research Results

- Continued to review model employed by implementation contractor to assess accuracy and reasonableness of model outputs.
- Continued to review and update program Measure Analysis Spreadsheets and Analytic Database.

Consumer Education and Outreach

- Participants receive either printed Home Energy Reports layered with an email version of the reports or an email-only version of the reports. Both types of reports provide energy usage benchmarks and customized energy efficiency tips to educate the customer and help them reduce consumption.

- Participants have access to a web portal that provides even greater insight into usage, comparisons (both personal and with similar homes), and variety of energy savings tips.
- APS customer service representatives have access to a portal where they can view the reports and discuss the information with customers as needed.

Problems Encountered and Proposed Solutions

No problems encountered during this reporting period.

Program Modifications/Terminations

Program was re-launched to customers during this reporting period.

Other Significant Information

In addition to conservation behavior savings, this program promotes other APS account management programs and customer self-service tools.

MER Adjusted Gross kW and kWh Savings

Table 23 - MER Adjusted Gross MW and MWh Savings - Conservation Behavior Program

Measure	# Participants	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Conservation Behavior Program	348,439	40,574	40,574	24.7
TOTAL	**348,439**	**40,574**	**40,574**	**24.7**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c. A total of $312,000 was shifted from the Residential New Homes and Multifamily Energy Efficiency program budgets to the Conservation Behavorial program during this reporting period.

6. Multifamily Energy-Efficiency Program

Description

The Multifamily Energy Efficiency Program ("MEEP") encourages energy efficiency improvements in multifamily complexes within the APS service territory.

MEEP uses a three-track approach to promote EE within the multifamily market segment.

- ***Track 1*** Provides free direct install measures to retrofit the residential dwellings of existing communities. Multifamily facility personnel, with implementation contractor field support, conduct all direct install installations.
- ***Track 2*** Provides complementary energy assessments of the community common area commercial facilities. The energy assessment identifies opportunities for additional DSM savings and the applicable Solutions for Business incentives that are available.
- ***Track 3*** Targets new construction and major renovation multifamily projects. This track builds from the success of the APS ENERGY STAR® New Homes program and encourages energy efficient building principles by paying an incentive to builders on a per unit basis for building to the energy efficiency standards outlined in a New Construction Builder Package.

Program Goals, Objectives, and Savings Targets

- Reduce peak demand and overall energy consumption in the multifamily housing market segment.
- Promote existing community efficiency retrofits of both dwelling units and common areas.
- Promote higher efficiency construction standards in the development of new multifamily projects.
- Increase overall awareness about the importance and benefits of energy improvements to the landlord and property ownership community.

Table 24 - Multi-Family Energy Efficiency Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
1.6	3,492	58,843

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

A total of 22 multifamily properties participated in the direct install program in 2018 totaling 4,454 apartment dwellings. In total there were 47,968 LEDs, 2,811 faucet aerators, and 1,897 showerheads installed in multifamily dwellings.

The New Construction/Major renovation program saw 6 projects participate in 2018. A total of 650 units received rebates in 2018.

Evaluation/Monitoring Activities and Research Results

- Continued to review and update program Measure Analysis Spreadsheets and Analytic Database.
- Continued review of implementation program tracking database and supporting HERS rating documentation to refine savings assumptions.

Consumer Education and Outreach

- Distributed MEEP brochures to customers
- Utilized door-to-door outreach to get program messaging out in the market place and to secure many of the program's participants
- Maintained a presence on aps.com to give customers a point of reference for all program information
- Provided customer educational leave behind materials promoting energy savings in all dwellings that were retrofitted
- Conducted MEEP presentations at community events
- Distributed a common area improvement program brochure
- Distributed promotional leave behinds for residents to inform them of other APS EE program offerings
- Utilized a landing page for aps.com/meep designed to make it easy for customers to get immediate assistance with program enrollment
- Distributed recognition plaques for MEEP New Construction projects completed in 2018
- Developed and distributed window clings for all multifamily communities retrofitted in 2018
- Promoted the program using a vehicle wrap on the Ford Transit used by the program

Problems encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No program modifications were made during this reporting period.

MEEP New Construction Optional Measures Installed

In Commission Decision No. 73089, APS was directed to report the number and type of optional measures that builders/developers are choosing to install, as well as energy savings, coincident demand savings, and actual cost for each optional measure selected by Multifamily New Construction participants.

A total of 6 multifamily new construction projects received rebates in 2018. All but one project was rebated through the performance path. The performance path allows builders or developers of Multifamily new construction projects to use any building design to reach program compliance as long as the building's performance, when tested by a certified HERS rater, meets the minimum performance HERS score. Thus, performance path projects don't select optional items from the prescriptive list. One project elected to use the prescriptive path. The optional measures chosen and other required information are included in the table below. Note that because builders are unwilling to share construction cost data, actual costs for the optional measures is not available. However, APS has included an estimate of incremental costs in the table below for each optional item using industry cost data.

Table 25 - Optional Measures Selected by MEEP New Construction Participants

Projects	HVAC Equipment	Lighting and/or Windows	Lighting, Windows and/or Fan Motor	Ducts	Savings per Measure kWh/Unit	Demand per Measure kWh/Unit	Incremental Cost
Sterling University Village	✓	✓		✓	1,326.39	0.458	$835.71

MER Adjusted Gross kW and kWh Savings

Table 26 - MER Adjusted Gross MW and MWh Savings - Multi-Family Energy Efficiency Program

Measure	# Units	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Direct Install Low Flow Showerhead	1,897	457	4,574	0.0
Direct Install Low Flow Faucet Aerators	2,811	149	1,487	0.0
Direct Install LEDs	47,968	2,807	42,112	0.3
NC Builder Package	650	1,210	24,202	0.4
TOTAL	**53,326**	**4,623**	**72,375**	**0.8**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Other Significant Information

No information to report at this time.

Costs Incurred

Cost information is provided in Tables 2b and 2c. In 2018, $100,000 was shifted from the Multifamily program to the Conservation Behavior program during this reporting period.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

7. Energy Wise Limited Income Weatherization

Description

APS's Energy Wise Limited Income Assistance Program is designed to improve the efficiency, safety and health attributes of homes for customers whose income falls within the defined federal poverty guidelines. This program serves low income customers with various home improvements including cooling system repair and replacement, insulation, sunscreens, water heaters, window repairs and improvements as well as other general repairs. Per Commission Decision No. 68647, the program is conducted in accordance with the rules of the federal Weatherization Assistance Program ("WAP"). WAP incorporates a performance-based energy audit procedure that focuses on optimizing investment in energy efficiency through a systems approach. Participating agencies utilize a Department of Energy site specific REM Design energy audit procedure that ensures that the overall Savings to Investment Ratio ("SIR") for the entire package of materials/measures including the cost of incidental repairs is greater or equal to one. In addition, participating agencies also use a prescriptive priority list developed by the Arizona Department of Housing to determine which cost effective measures to install. There is also a multifamily housing component designed to extend the benefits of weatherization to these types of complexes. The program is administered by various community action agencies throughout APS's service territory.

Program Goals, Objectives, and Savings Targets

- To improve the efficiency of homes for customers whose income falls within the defined poverty guidelines.
- To provide customers information on energy management and conservation.

Table 27 - Limited Income Weatherization Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.2	1,393	25,065

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

A total of 494 households received assistance during the Reporting Period. A single household may have received more than one type of assistance.

Evaluation/Monitoring Activities and Research Results

Weatherization measures must pass the cost effectiveness test that is detailed in the federal government's Weatherization Assistance Program (WAP) rules. These rules allow certain prescriptive measures, which vary with the climate zone and type of housing construction. Measures not on the prescriptive list must be assessed by a computer analysis to determine the economic feasibility.

The Arizona Department of Housing Weatherization Assistance Program (ADOH WAP), with information from APS, has been analyzing the electric energy used in weatherized homes before and after the weatherization measures were implemented. It takes a year of data before the weatherization and another year of data after the weatherization to get an

accurate gauge of the impact of the measures. As the data base grows over time, a more accurate picture of the impact of the weatherization activities will emerge.

The latest information from the Governor's Office of Energy Policy (GEOP) report is provided below:

Utility Bill Analysis

This report includes jobs completed across Arizona using data provided by APS, TEP, Unisource Gas and Electric and Southwest Gas utility data. This analysis is ongoing, new data will be updated to these values on a quarterly basis.

Provided are Savings to Investment Ratios (SIR) for total investment from all funding spent (diagnostics, energy measures and health and safety measures) and for energy related measure only (diagnostics and energy measures).

Assumptions

Present value is based on 17.5 years measure life, discount rate of 3% and a utility cost escalation rate of 3%.

Results Summary

The combined SIR of all jobs reviewed to date for funds (LIHEAP, DOE, Utilities, CDBG, URRD, SERC) spent on diagnostics, energy measures and health and safety measures is currently at 1.0. Health and safety represented 19% of expenditures.

The combined SIR of all jobs reviewed to date for funds spent on energy measures and diagnostics only (not including health and safety measures) was 1.22

The average saving per home reviewed was 2,270 kWh and 33 therms of natural gas (gas therms average includes all electric homes).

It should be noted that, GOEP study savings are based on an average of all homes located throughout the state that participated in the study.

Consumer Education and Outreach

- Conducted weatherization outreach and field visits to participating CAP offices
- Sponsored weatherization workshops with Red Feather in the Tuba City area for Navajo Nation and Hopi Nation customers
- Participated in Arizona Department of Housing State Weatherization Policy Advisory Committee meetings for developing the Department of Energy State plan
- Partnered with the International Sonoran Desert Alliance (ISDA) to incorporate weatherization training into the local journeyman training.
- Attended State Weatherization Peer to Peer meetings
- The APS field team was incorporated into the weatherization program in 2018. The field team has traveled to all state agencies that provide weatherization services to APS customers and trained field staff, admin and intake workers on the new rate structures, and how to manage around Demand, and TOU based rate structures.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this Reporting Period.

MER Adjusted Gross kW and kWh Savings

Table 28 - MER Adjusted Gross MW and MWh Savings - Low Income Weatherization

Measure	# Homes	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Weatherization	494	1,194	21,497	0.2
TOTAL	**494**	**1,194**	**21,497**	**0.2**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

The kW factor used to calculate the savings are based on data from the GEOP study. The annual energy demand savings per home in this study are estimated to be 0.3 kW. A 17.5 years measure life and kWh savings factor of 2,270 kWh per home, from the current GOEP report, has been utilized to determine the appropriate kWh savings.

Benefits and Net Benefits/Performance Incentive Calculation

The net benefits for this program are provided in Tables 6 and 8.

Costs Incurred

Costs incurred for this program during the current reporting period are listed below:

Table 29 - Cost Incurred - Low Income Weatherization

Activity	Incentives	Training & Technical Assistance	Consumer Education	Program Implementation	Program Marketing	Planning & Admin	Program Total Cost
Health & Safety	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Repair and Replace	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Weatherization	$ 2,936,867	$ 6,300	$ 244,960	$ 45,366	$ 20,468	$ -	$ 3,253,961
APS Program Support	$ -	$ -	$ -	$ -	$ -	$ 140,596	$ 140,596
Total	**$ 2,936,867**	**$ 6,300**	**$ 244,960**	**$ 45,366**	**$ 20,468**	**$ 140,596**	**$ 3,394,557**

Note: This table displays all Energy Wise Program costs, including Health and Safety, and Repair and Replace. However, these categories are not included in Table 2.

Commission Decision No. 73089 requires APS to report spending for non-EE measures in the Energy Wise Program. There were no non-EE measures or associated spending in this program during this timeframe.

V. Non-Residential Programs

8. Large Existing Facilities

Description

The Large Existing Facilities Program provides prescriptive incentives for owners and operators of large (more than 100 kW aggregated peak monthly demand) Non-Residential facilities to promote efficiency improvements in technologies such as HVAC, HVAC controls and variable speed drive applications. For efficiency applications not covered by the prescriptive incentives, the program offers new construction and custom incentives that are evaluated individually based on energy savings. The program also provides incentives to reduce the cost of an energy study that identifies energy-saving, energy storage and load shifting opportunities. The program provides educational and promotional materials designed to assist facility and business owners and operators in making decisions to improve the performance of their facilities.

Program Goals, Objectives and Savings Targets

- Promote and support DSM opportunities for existing large Non-Residential customers.
- Promote the installation of high-efficiency technologies including, but not limited to HVAC equipment, HVAC controls and variable speed drives.
- Promote market transformation through APS Trade Allies and customer outreach.

Table 30 - Large Existing Facilities Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
25.6	151,467	2,018,955

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

During this Reporting Period, APS paid $5,313,086 in Large Existing Program incentives. This figure represents a total of 524 paid applications from 181 unique customers and includes projects implemented through Direct Install. Payments to school districts and charter schools comprised 1 of the 524 applications.

Table 31 - Large Existing Facilities Program Incentives Paid

Incentive Status by Fund for Paid Applications	Incentives Paid
Large Existing – Prescriptive & Custom	$5,289,673
Large Existing – Studies	$18,750
Large Existing – Retro-commissioning Studies	$4,6630
Total Large Existing Funds	**$5,313,086**

In Commission Decision No. 70637, APS was required to track DSM applications resulting from studies for which incentives have been paid and to report results to the Commission. During this Reporting Period, APS paid incentives for 6 study applications from 6 customers

including 5 feasibility studies. Two of the 6 studies have already resulted in implementation of the associated measures. Since the program's inception, 526 studies have been completed. Of those 526 studies, 201 have resulted in EE project applications to date.

In Commission Decision No. 73089, APS was required to report the type of measures installed by customers after a study was completed. For studies completed in 2018, the measures installed were lighting and custom lighting.

Evaluation/Monitoring Activities and Research Results

- Updated energy and demand savings for Energy Management System (EMS) measure. The updates account for customers who may use EMS to reduce peak load based on guidance that APS will provide during measure implementation.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Completed updates to hourly load shape assumptions for the re-design of the Custom program's incentive structure to focus on peak-reducing impacts on system load.
- Continued to develop and update hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential measure analysis spreadsheets and analytic database.
- Performed detailed review of program applications administered by the program implementer and provided input on which data fields were not necessary for evaluation activities.

Consumer Education and Outreach

Outreach activities for the Large Existing Program focused on responding to customer requests and project application support. The program team provided presentations and information to stakeholder associations. During the 2018 Reporting Period, these activities included participation in the following meetings (estimated attendance included below):

- April 17 – Yuma Hoteliers Meeting (15 attendees)
- June 21 – APS Regional Update Meeting, Yuma (20 attendees)
- Aug 8 – APS Regional Update Meeting, Yuma (12 attendees)
- Sept 11 - Arizona Small Business Association Mixer (150 attendees)
- Oct 12 – APS Regional Update Meeting, Parker (13 attendees)

In 2018, the program focused on educating customers on energy management best practices. Communications channels included bill inserts, bill messages, newsletters and emails. The Business Energy Analyzer tool was the most promoted resource and was included as an additional resource in APS's summer preparedness education campaign.

The QuickLook fact sheet has been a staple marketing piece of the program since inception. It has historically only focused on rebates and services offered through the DSM program. This year it was refreshed to highlight online account management resources in addition to the rebates. Once a customer sets up their online account (My Account) they can compare their usage year over year to identify savings opportunities. They can also set a monthly usage threshold and receive an email or text alert when they have met it. This helps them avoid surprises and actively conserve energy for the remainder of the month to manage their costs.

This year the program created seven new fact sheets that are targeted for specific business types to provide them with energy management best practices and savings tips, including:

- Retails shops
- Grocery and convenience stores
- Patient care facilities
- Hotels and motels
- Office spaces
- Restaurants
- Educational facilities

Upgrading equipment can have many benefits beyond energy savings. We focused on the three most common technologies for our education efforts: lighting, HVAC and IT equipment. Fact sheets were developed to help customers better understand the technology so that they would feel more confident during the buying process and would consider benefits such as productivity and employee comfort in their decision-making process.

Several emails were sent throughout the year to highlight the tools available to help customers manage their energy use: Business Energy Analyzer and Energy Guides.

Commission Decision No. 73089 requires APS to report Energy Management System (EMS) and LED measures, annual savings, capacity savings and measure life individually. See Table 32 below:

Table 32 - Large Existing Facilities Program Measures

Measure	Quantity	kWh Savings	kW Savings	Measure Life
EMS - DDC Replacing Pneumatic or Manual Thermostat	251,131 sq. ft.	917,981	183	15
EMS - DDC Replacing Programmable Thermostat or Digital System	1,561,970 sq. ft.	4,559,973	910	15
EMS - Integrated Lighting Control	444,149 sq. ft.	812,325	152	10
LED - Non-reflector	12,139	1,837,193	360	7
LED – Reflector	4,653	653,978	143	7
LED - MR16	2,698	367,217	62	7

Linear LED 2 Foot	10,452	271,610	47	17
Linear LED 3 Foot	1,236	68,602	12	17
Linear LED 4 Foot	185,385	9,821,364	1,720	17
Linear LED 8 Foot	4,154	294,148	52	17
Outdoor LED Watts <= 50	186	113,613	0	15
Outdoor LED Watts >50 & <300	0	0	0	15
Refrigerated Case LED - No Sensors	68	37,245	4	6

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2018, APS did not raise the rebate amount for any measure that caused it to exceed 50% of the incremental cost of the measure.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

During this Reporting Period, there were no program modifications or measures terminated.

Self-Direction

In this Reporting Period, no customers participated in Self-Direction. On November 30, 2018, APS filed a notice of intent to discontinue Self-Direction on January 1, 2019.

Freeport McMoran Opt-Out Provision

Commission Decision No. 74813 exempted Freeport McMoran from paying into the DSMAC and participating in the Solutions for Business program for their Bagdad mine. It was furthered ordered by the ACC that Freeport McMoran continue to obtain and report energy efficiency activities and savings on an annual basis for their Bagdad mine. During this Reporting Period, Freeport McMoran reported installing high-efficiency motors, variable speed drives and LED lighting. Based upon the information provided by Freeport McMoran, APS estimates that the Freeport McMoran Bagdad mine saved approximately 2,730 MWh annually. As ordered, these savings from the Freeport McMoran Bagdad mine are not included in the savings values reported as part of this Demand Side Management portfolio.

Direct Install

On September 29th, 2017, the Direct Install program element was discontinued. Direct install measures were not offered during this Reporting Period, however incentive payments for projects submitted in 2017 were paid in the 2018 Reporting Period. While these measures were targeted to small businesses, program rules allowed small facilities (under 400 kW demand) of large customers to participate. K-12 school buildings of any size could also participate in Direct Install measures. During this Reporting Period, 2 Direct Install projects for Large Existing Facilities were paid a total of $4,289 in incentives. Pursuant to Commission Decision No. 73089, APS has provided a breakdown of required Direct Install program information within the Small Business section.

Trade Allies

Trade Allies are contractors and other industry professionals who deliver DSM solutions to customers. The program incorporates a Trade Ally program to ensure an informed and engaged network of service providers work with APS's customers. To be listed as a Solutions for Business Trade Ally, a company must submit an application and attend program training. To remain on the list, the company must participate in the rebate program. Additionally, each Trade Ally must maintain good customer service performance and represent the Solutions for Business Program appropriately in accordance with the APS Solutions for Business Policies and Procedures. Outreach is conducted through strategic partnerships within the energy and contracting industry as well as trade show and event participation. In-house Trade Ally training is provided, which consists of educating contractors on utilization and promotion of the program.

In addition to the training classes, the program participated in the following Trade Ally-focused events:

- April 11 – Building Operator training, Electric League of Arizona Event (20 attendees)
- Oct 31 – Building Operator training, Electric League of Arizona (15 attendees)

Six (6) new companies submitted applications, received training and were approved to participate as Solutions for Business Trade Allies during the 2018 program year, bringing the total number of participating Trade Allies to 122 at the end of this Reporting Period.

MER Adjusted Gross kW and kWh Savings

The following table reflects the MER adjusted total energy and demand saving achievements in this reporting period for the Large Existing Facilities Program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 33 - MER Adjusted Gross MW and MWh Savings - Large Existing Facilities

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Large Existing Facilities	108,311	1,671,004	19.2
TOTAL	**108,311**	**1,671,004**	**19.2**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred During the Reporting Period

Cost information is provided in Tables 2b and 2c.

9. New Construction and Major Renovations

Description

The Non-Residential New Construction and Major Renovations Program includes four elements: 1) Design Assistance and Feasibility Studies, 2) Custom measures, 3) Prescriptive measures, and 4) Whole Building applications. Design incentives involve efforts to integrate DSM into a customer's design process to influence equipment/systems selection and specification as early in the process as possible. Custom and prescriptive incentives are available for DSM improvements in HVAC, HVAC controls and variable speed drives. Whole Building applications are intended to promote integrated design strategies.

Program Goals, Objectives and Savings Targets

- Promote integrated design and integrated analysis of alternative high-efficiency design packages through design assistance in new construction and major renovation applications.
- Assist the customer design team in examining alternative high-efficiency design packages through the provision of the design incentive.
- Promote market transformation through APS Trade Allies and customer outreach.

Table 34 - New Construction Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
4.3	18,064	272,989

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

In this Reporting Period, APS paid a total of $1,175,015 in New Construction incentives. This represents 59 applications from 36 unique customers. Two (2) of the 59 applications were from a school district.

Incentive status is provided below.

Table 35 - New Construction Program Incentives Paid

Incentive Status for Paid Applications	Incentives Paid
Large New Construction – Prescriptive & Custom	$1,080,415
Large New Construction – Studies	$94,600
Total Large New Construction Funds	**$1,175,015**

Commission Decision No. 70637 required APS to continue tracking DSM customer applications resulting from studies for paid incentives, and report the semi-annual and cumulative results of its program-to-date tracking efforts. During this Reporting Period, 13 design assistance studies were paid a total of $94,600. Six (6) of these 13 applications have resulted in DSM projects to date. Since program inception, 117 studies have been completed. Of those 117 studies, 77 resulted in applications for DSM projects.

Commission Decision No. 73089 required APS to report the type of measures installed subsequent to the receipt of study or design assistance incentives. The following measures were installed for studies completed in 2018: improved performance of lighting power density, building envelope and high-efficiency HVAC, compared to ASHRAE 90.1 2010 baseline. These measures were applied through the Whole Building application.

APS Solutions for Business launched the Whole Building incentive in January 2010. During this Reporting Period, the program received one (1) Whole Building Pre-Notification applications and 6 Whole Building Final-Notification applications; 7 Whole Building projects were paid incentives.

Evaluation and Monitoring Activities and Research Results

- Updated energy and demand savings for Energy Management System (EMS) measure. The updates account for customers who may use EMS to reduce peak load based on guidance that APS willprovide during measure implementation.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Completed updates to hourly load shape assumptions for the re-design of the Custom program's incentive structure to focus on peak-reducing impacts on system load.
- Continued to develop and update hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential measure analysis spreadsheets and analytic database.
- Performed detailed review of program applications administered by the implementation contractor and provided input on which data fields were not necessary for evaluation activities.

Consumer Education and Outreach

In addition to the marketing and outreach activities described for the Large Existing Program, outreach activities for the New Construction Program included responding to customer requests and project application support.

Problems Encountered and Proposed Solutions

No problems were encountered during this Reporting Period.

Program Modifications/Terminations

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2018, APS did not raise the rebate amount for any measure that caused it to exceed 50% of the incremental cost of the measure.

During this Reporting Period, there were no program modifications or measures terminated.

MER Adjusted Gross kW and kWh Savings

The following table reflects the MER adjusted total energy and demand saving achievements in this reporting period for the Large New Construction Program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 36 - MER Adjusted Gross MW and MWh Savings - Non-Residential New Construction and Major Renovation

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
New Construction and Major Renovation	15,968	239,434	2.7
TOTAL	**15,968**	**239,434**	**2.7**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

10. Small Business Program

Description

The Non-Residential Small Business Program provides prescriptive incentives for small Non-Residential customers (≤100 kW of aggregated peak monthly demand) for DSM improvements in HVAC, HVAC controls and variable speed drive applications. Small Business customers are also eligible for new construction and custom incentives to implement DSM measures. On September 29th, 2017, the Direct Install program element was discontinued. Direct install measures were not offered during this Reporting Period, however incentive payments for projects submitted in 2017 were paid in the 2018 Reporting Period.

Program Goals, Objectives and Savings Targets

- Promote and support DSM opportunities for small Non-Residential customers.
- Promote the installation of high-efficiency equipment.
- Promote market transformation through APS Trade Allies and customer outreach

Table 37 - Small Business Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.7	3,931	34,847

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

Of the 43 small business projects paid, 40 were conducted through the Classic prescriptive/custom program and 3 were conducted through Direct Install. None of the 43 applications were from school districts.

APS paid incentives on 43 applications from 33 unique customers during this Reporting Period.

Table 38 - Small Business Program Incentives Paid

Incentive Status for Paid Applications	Incentives Paid
Small Business – Prescriptive & Custom	$58,414
Small Business – Studies	$0
Total Small Business Funds	**$58,414**

Commission Decision No. 70637, required APS to continue tracking DSM customer applications resulting from studies for paid incentives, and report the semi-annual and cumulative results of its program-to-date tracking efforts. There were zero study incentives paid in the Small Business Program during this Reporting Period. Twenty-one (21) studies

have been completed since program inception, of which 8 study applications have resulted in EE projects.

In Commission Decision No. 73089, required APS to report the type of measures installed by customers after a study was completed. During the reporting period there were no measures installed as a result of the studies completed.

Evaluation and Monitoring Activities and Results

- Updated energy and demand savings for Energy Management System (EMS) measure. The updates account for customers who may use EMS to reduce peak load based on guidance that APS will provide during measure implementation.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Continued to develop and update hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential measure analysis spreadsheets and analytic database.
- Performed detailed review of program applications administered by the implementation contractor and provided input on which data fields were not necessary for evaluation activities.

Consumer Education and Outreach

In addition to the marketing and outreach activities described for the Large Existing Program, outreach activities for the Small Business Program focused on providing engineering support to the APS Call Center for more technical customer inquiries regarding energy saving opportunities.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminated

Commission Decision No. 73089 requires APS report the number of EMS and LED measures installed, the annual energy and capacity savings, and measure life on an individual basis. Please see the table below:

Table 39 – Small Business Program Modifications

Measure	Quantity	kWh Savings	kW Savings	Measure Life
LED - non-reflector	1,499	226,868	44	7
LED – reflector	175	24,596	5	7
LED - MR16	25	3,403	1	7
Linear LED 3 Foot	47	1,591	0	17
Linear LED 2 Foot	8	444	0	17
Linear LED 4 Foot	2,564	175,725	31	17
Linear LED 8 Foot	6	425	0	17

Commission Decision No. 68488 requested that APS inform staff when incentives were paid out that exceeded 50% of the incremental cost of the measure. During 2018, APS did not raise the rebate amount for any measure that caused it to exceed 50% of the incremental cost of the measure.

MER Adjusted Gross kW and kWh Savings

The following table reflects the total energy and demand saving achievements in this reporting period for the Small Business Program. Only savings from projects that were completed and incentives paid are counted in this Progress Report.

Table 40 - MER Adjusted Gross MW and MWh Savings - Non-Residential Small Business Program

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Small Business	1,201	14,735	0.3
TOTAL	**1,201**	**14,735**	**0.3**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c.

Direct Install

Direct Install measures were not offered to APS customers during the reporting period. Activity during the 2018 program year was limited to paying out the remaining 2017 Direct Install project applications.

Pursuant to Commission Decision No. 73089, APS is providing a breakdown of required Direct Install Program information below. Direct Install incentives were paid on 3 projects for Small Business customers during this Reporting Period. While small businesses were the

primary target for the Direct Install offering, large customers with facilities of 400 kW or less premise demand qualified for Direct Install measure incentives, and schools of any size could participate. In addition to the 3 projects paid to small businesses, 5 Direct Install projects for Large Businesses and Schools were paid.

Projects implemented through Direct Install during this reporting period saved 533 MWh annually and 9,016 MWh over the lifetime of the measures.

1. Active Number of Contractors and Contractor Identification: Direct Install measures were not offered during this Reporting Period, therefore there were no active contractors.

2. Number of Direct Install Jobs Completed: A total of 8 Direct Install projects were paid incentives during this reporting period.

***3. Dollar Value of the Direct Install Incentives Paid to Contractors*:** During this Reporting Period, $63,099 in Direct Install incentives were paid to contractors. This represents 29% of the total project costs.

4. Dollar Value of the Direct Install Jobs Paid by the Customer: The total cost of the Direct Install projects during this reporting period was $214,694. Customers paid $151,595 toward these Direct Install projects during this reporting period.

5. Quantity of Each Direct Install Measure for Which Incentives Were Paid:

Table 41 - Direct Install Measures

Direct Install Measure	Quantity
Delamping	0
T8 Lighting	0
LED Lighting	3,161
Occupancy Sensors	0
Exit Signs	0
Refrigerated Case Fan Motors	0
Anti-Sweat Heater Controls	0
Refrigerated Novelty Case Controls	0
Refrigerated Case Evaporator Fan Controls	0
Hard-Wired CFL	0
Occupancy Sensors - Vending Machines	0

***6. Number of Instances Where Incentives Were Reduced Because of Eligibility for Incentives Paid by Other Entities*:**

No known occurrences during this reporting period.

7. Spending and Savings Numbers Attributable to Direct Install for the Period and Year-to-Date and Program-to-Date:

Table 42 - Direct Install Savings Year-to-Date

kW Savings	Annual kWh Savings	Lifetime kWh Savings
155	532,906	9,015,642

Table 43 - Direct Install Savings MER Adjusted Program-to-Date

kW Savings	Annual kWh Savings	Lifetime kWh Savings
36,911	186,018,807	2,640,524,382

**MER savings are adjusted for line losses (energy 7.2%, demand 11.7%) and a capacity reserve factor of 15%*

Rebate spending for Direct Install was $63,099 in 2018 and was $21,499,472 program to date.

8. Descriptions of the Types of Businesses Participating in Direct Install: The K-12 School and Miscellaneous sector participated in the Direct Install measure at the highest rate of frequency within identified business segments and accounted for 75% of Direct Install projects paid during this Reporting Period.

Table 44 - Direct Install Participation

Participation included the following business types:	
Grocery	0
Hotel/Motel	0
K-12 School	3
Medical	0
Miscellaneous	3
Office	0
Process Industrial	0
Restaurant	0
Retail	1
Warehouse	1

9. Estimate of Avoided Marketing or Other Program or Administration Costs:

Direct Install measures were not offered during this reporting period, therefore there were no avoided marketing or other program or administrative costs.

11. Schools Program

Description

The Schools Program includes a dedicated budget for schools and provides assistance for reducing the energy used in school buildings, including public, private and charter schools ("K-12"). The incentives available for schools include the same DSM measures that are available for all Non-Residential customers, as well as lighting and refrigeration measures.

Program Goals, Objectives and Savings Targets

- Maximize the energy savings that can be attained with available DSM funds by providing schools incentives to upgrade lighting, HVAC, refrigeration and any other energy-consuming systems.
- Provide educational and training materials to facility managers and Trade Allies in order to aid schools in other energy conservation projects.
- Promote market transformation through APS Trade Allies and customer outreach.
- Provide incentives for other cost-effective DSM projects by allowing schools to participate in any Non-Residential DSM Program.

Table 45 - Schools Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.9	4,561	65,295

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

In this reporting period, APS paid incentives for 85 applications from schools, of which 82 were paid from the schools fund category. This represents 30 unique school districts and charter schools.

The self-reported size of the school entity (based on the number of students) for approved applications paid in this reporting period are:

Table 46 - Schools Program Applications

Division	Programs	# of Applications	# of Students
Metro	Custom Measures - Retrofit, K-12 School Prescriptive Measures - Retrofit, Express Solutions	13	22,518
Metro	Custom Measures - Retrofit, Prescriptive Measures - Retrofit	3	33,085
Metro	Custom Measures - Retrofit, Prescriptive Measures - Retrofit	7	5,370
Metro	Prescriptive Measures - NC, Custom Measures - New Construction	2	143
Metro	Custom Measures - Retrofit	1	767
Metro	New Construction - WB Construction, New Construction - WB Design, Technical Assistance & Studies, K-12 School Prescriptive Measures - NC	4	5,750
SouthWest	Custom Measures - Retrofit	1	380
Metro	Custom Measures - Retrofit	1	1,206
Metro	Custom Measures - Retrofit, Prescriptive Measures - Retrofit	2	363
SouthEast	Prescriptive Measures - Retrofit, Custom Measures - Retrofit	2	1,087
Metro	Custom Measures - Retrofit, Prescriptive Measures - Retrofit	2	1,799
SouthEast	Prescriptive Measures - Retrofit	1	829
Metro	Prescriptive Measures - Retrofit	1	903
Metro	Custom Measures - Retrofit, Prescriptive Measures - Retrofit, K-12 School Prescriptive Measures - Retrofit	5	31,244
Metro	Prescriptive Measures - Retrofit, K-12 School Prescriptive Measures - Retrofit, New Construction - Whole Building Construction, Technical Assistance & Studies, New	6	7,766

	Construction - Whole Building Design		
Metro	Prescriptive Measures - Retrofit	1	5,480
Metro	Custom Measures - NC	1	247
NorthWest	Custom Measures - Retrofit	2	1,444
Metro	K-12 School Prescriptive Measures - Retrofit	1	23,999
SouthEast	Prescriptive Measures - Retrofit	1	3,362
NorthWest	K-12 School Prescriptive Measures - Retrofit	10	5,569
SouthEast	K-12 School Prescriptive Measures - Retrofit	3	3,867
Metro	K-12 School Prescriptive Measures - Retrofit	1	36,624
SouthEast	K-12 School Prescriptive Measures - Retrofit	5	8,570
Metro	K-12 School Prescriptive Measures - NC	1	399
Metro	K-12 School Prescriptive Measures - NC	1	75
SouthEast	K-12 School Prescriptive Measures - NC, Prescriptive Measures - NC	2	6,771
Metro	K-12 School Prescriptive Measures - Retrofit	1	6,056
Metro	K-12 School Prescriptive Measures - Retrofit	1	538
Metro	K-12 School Prescriptive Measures - Retrofit	1	828
Metro	K-12 School Prescriptive Measures - Retrofit	1	736
SouthEast	K-12 School Prescriptive Measures - Retrofit	1	255

When an incentive application is received from a school district and deemed eligible, funding is first allocated from the Schools budget up to a maximum of $100,000. Any additional funding required to cover the application is then allocated from the appropriate Large Existing, New Construction or Small Business Program budget.

APS paid $738,126 in incentives to schools during the reporting period, of which $650,854 was paid from the Schools Program budget. The remaining $87,272 was paid to schools from the Large Existing, Small Existing and New Construction Program budgets (see tables below).

Table 47 - Schools Program Incentives Paid from Program Budget

Incentive Status by Fund for Paid Applications	Incentives Paid
Schools Budget – Prescriptive, Custom, and Direct Install	$640,854
Schools Budget – Feasibility, Design Assistance	$10,000
Schools Budget – Retro commissioning Studies	$0
Total School Funds	**$650,854**

Table 48 – Total Schools Program Incentives Paid

Schools Funding Summary:	Incentives Paid
Schools – School Funds	$650,854
Schools – Large Existing Funds	$20,667
Schools – New Construction Funds	$66,605
Schools – Small Business Funds	$0
Total Paid to Schools	**$738,126**

In Commission Decision No. 70637, the Commission ordered APS to continue tracking DSM applications resulting from studies for which incentives have been paid, and report the semi-annual and cumulative results of its program-to-date tracking efforts. One (1) design study incentive was paid from the school funds during this reporting period for a total of $10,000. This application resulted in 1 energy efficiency project. Since program inception, 68 studies have been completed at schools; of those 68 studies, 55 have resulted in EE projects at schools.

In Commission Decision No. 73089, the ACC requested that APS report the type of measures installed after a study was completed. The following measures were installed for studies completed in 2018: whole building.

Schools Direct Install

Direct Install incentives were paid on 3 school projects during this reporting period. Of the 3 projects, 3 were paid from the Schools fund. Direct Install activities for this period are described in the Small Business Program report.

Pursuant to Commission Decision No. 73089, APS has provided a breakdown of required Direct Install program information within the Small Business section.

Evaluation and Monitoring Activities and Research Results

- Updated energy and demand savings for Energy Management System (EMS) measure. The updates account for customers who may use EMS to reduce peak load based on guidance that APS will provide during measure implementation.
- Completed updates to hourly load shape assumptions for commercial lighting measures to identify impacts of efficient lighting on overall system load.
- Continued to develop and update hourly commercial end-use load shapes for all non-residential measures based on field studies, energy simulation modelling and secondary research.
- Conducted ongoing review and analysis of implementation contractor participation databases.
- Reviewed and updated non-residential measure analysis spreadsheets and analytic database.
- Performed detailed review of program applications administered by the implementation contractor and provided input on which data fields were not necessary for evaluation activities.

Consumer Education and Outreach

Marketing and Outreach activities described for the Large Existing program included K-12 schools, specifically the Education fact sheet which explains how proper energy-management can improve the learning environment and ultimately test scores.

Coordination with the Schools Facility Board ("SFB")

Staff attends SFB meetings to stay abreast of school EE projects, both funding and progress. Emergency repairs approved by SFB include equipment covered by program specifications such as cooling systems. As these are approved, Solutions for Business follows up with the districts to see how they can assist in planning the upgrades, scoping projects, reviewing plans, and completing the rebate application to produce the deepest savings and rebates possible through the program.

Coordination with the APS Schools Key Account Managers

Program staff coordinates with the APS Key Account Managers ("KAM") who have schools assigned to them to optimize the customer's time and value during planned meetings, focused emails and phone calls. The partnership with the APS Schools KAMs has facilitated troubleshooting of other related customer issues or concerns and the cross-promotion of other DSM programs, which will benefit the schools while improving their energy efficiency.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

During this reporting period, EMS and LED measures were installed. Commission Decision No. 73089 requires APS report the number of these measures installed, the annual energy and capacity savings, and measure life on an individual basis. Please see Table 49 below:

Table 49 –Schools Program Measures Savings

Measure	Quantity	kWh Savings	kW Savings	Measure Life
EMS - DDC Replacing Pneumatic or Manual T-stat	0 sq. ft	0	0	15
EMS - DDC Replacing Programmable T-stat or digital system	47,190 sq. ft.	111,509	22	15
EMS - Integrated Lighting Control	0 sq. ft.	0	0	10
LED - non-reflector	1,018	154,070	30	7
LED – reflector	1,419	199,440	44	7
LED - MR16	40	5,444	1	7
Linear LED 2 Foot	663	21,555	4	17
Linear LED 3 Foot	73	4,052	1	17
Linear LED 4 Foot	54,696	3,143,998	579	17
Linear LED 8 Foot	12	850	0	17
Outdoor LED Watts <= 50	1,138	695,114	0	15
Outdoor LED Watts >50 & <300	443	750,720	0	15

See the Large Existing, New Construction and Direct Install Program sections for a list of program changes.

MER Adjusted Gross kW and kWh Savings

The following table reflects the total energy and demand saving achievements for schools projects completed and paid during this reporting period.

Table 50 - MER Adjusted Gross MW and MWh Savings - Non-Residential Schools Program

Program	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Schools - School Program Funds	10,425	169,049	2.8
Schools - Large Existing Program Funds	498	7,361	0.1
Schools - New Construction Program Funds	137	2,049	0.1
Schools - Small Business Program Funds	-	-	-
TOTAL	**11,060**	**178,459**	**3.0**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c. As authorized by Commission Decision No. 74406, $440,000 was shifted from the Large Existing Program to the Schools program.

12. Energy Information Services ("EIS") Program

Description

The EIS Program started in November 2006 with an objective to help customers (>100 kW) save energy through better understanding and control of their facilities' electrical usage. EIS is a tool that provides data regarding usage (kWh) and demand (kW). This detailed information allows customers the ability to fine-tune equipment use, operations and produce summaries to document the impact of usage and demand modifications. Participating customers monitor their electric usage through a web-based dashboard that allows them to view historical 15-minute interval usage and demand graphics from the previous day. This information can be used to improve and monitor energy usage patterns, reduce energy use, reduce demands during on-peak periods and better manage overall facility energy operations.

APS is encouraging customers to take advantage of the EIS program by providing a one-time incentive of up to a maximum of $12,000 per year of the cost of installing metering and communications equipment necessary to participate in the program.

Program Goals, Objectives and Savings Targets

- Provide monthly energy usage information to participating Non-Residential customers. Participants identify strategies to lower energy cost by reducing energy usage and demand.
- Educate EIS program participants about utility rate concepts and how managing or reducing their energy consumption through DSM measures and operational practices can reduce their energy expenses.
- Educate participants on how to download billing history information and create spreadsheets to chart and graph their energy use, as well as to identify consumption trends and savings opportunities.
- Educate EIS participants about creating reports for management that justify energy-efficient capital expenses intended to produce operations and maintenance savings.
- Facilitate analysis of what-if scenarios to help facility manager to assess the benefits of capital improvements or operating adjustments to promote energy efficient changes.

Table 51 - Energy Information Services Program Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
3.5	3,370	16,850

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

Several customers were added and several opted out of the program in 2018. The result was no net change in the number of EIS customers. The number of enrolled meters was increased by 165 in 2018. A total of 70 customers comprised of 507 meters are currently enrolled in the EIS program.

Evaluation and Monitoring Activities and Research Results

- Reviewed and updated program Measure Analysis Spreadsheets and Analytic Database.
- Conducted ongoing tracking and review of program participation data.

Consumer Education and Outreach

Key Account Managers proactively arranged meetings between customers and the program team to discuss the customer's objectives and demonstrate the product's capabilities/benefits. The team also provided training to new employees at the customer's request to ensure the tool continued to be successfully utilized in spite of employee turnover.

The program continued to develop and foster relationships with industry and stakeholder associations to enhance outreach efforts and connections with members. The program team provided presentations and information to stakeholders. During the 2018 reporting period, these activities included participation in the following meetings (estimated attendance included below):

- May 8 – APS Energy Update Meeting – Metro (112 attendees)
- June 21 – APS Regional Update Meeting, Yuma (20 attendees)
- Aug 8 – APS Regional Update Meeting, Yuma (12 attendees)
- Oct 12 – APS Regional Update Meeting, Parker (13 attendees)

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this reporting period.

MER Adjusted Gross kW and kWh Savings

Table 52 - MER Adjusted Gross MW and MWh Savings - Non-Residential Energy Information Services Program

Program	# Meters	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Energy Information Services	236	5,327	26,636	5.5
TOTAL	**236**	**5,327**	**26,636**	**5.5**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Cost information is provided in Tables 2b and 2c. As authorized by Commission Decision No. 74406, $125,000 was shifted from the Large Existing Program to the EIS program.

VI. Demand Response Programs

Time of Use ("TOU") Rates

Description

TOU rates are designed 1) to reflect the time variation in the cost of producing electricity, to more accurately match those costs with the service being provided to the customer thereby encouraging efficient use of energy, and 2) to encourage customers to reduce consumption during peak hours or to shift energy usage to off-peak periods.

Program Goals, Objectives and Savings Targets

The program is estimated to provide a 2018 load reduction amount of approximately 164.4 MW The 164.4 MW total load reduction provides a calculated estimate of 720,072 MWh in annual savings from January through December 2018. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiatives Load Reduction and Energy Savings 2018.

Levels of Customer Participation

Approximately 632,258 customers are enrolled in TOU rates. As of December 2018, 171 schools were enrolled in the TOU school rates.

Evaluation/Monitoring Activities and Research Results

For the purposes of this report, no evaluation of TOU rates was performed during this reporting period.

Consumer Education and Outreach

The TOU marketing outreach is outlined below:

- An extensive communication and rates education campaign was conducted throughout 2018, including online, digital media, social media, email and bill communications.
- TOU customers received "Welcome Kits" with a magnet summarizing the TOU hours and an insert directing them to "Shift, Stagger, and Save" messaging and tips.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Programs or Measures Modifications/Terminations

No programs or measures were modified or terminated during this reporting period.

APS Peak Solutions® Program

Description

APS Peak Solutions® is a commercial and industrial demand response ("DR") program for APS's Yuma and Phoenix metro customers utilizing direct load control and manual load reduction.

The program began on June 1, 2010 and is available for the summer months of June through September between 12:00 noon and 8:00 p.m. (Sunday - Saturday) daily. Customers are notified approximately two hours prior to the start of a Peak Solutions® event. Events are limited to minimum of one hour and maximum of four hours per day and 80 event-hours during the season.

Customers are paid an incentive check at the end of the season for their enrolled and/or delivered load reduction amount based on $/kW or $/ton of air conditioning.

Program Goals, Objectives and Savings Targets

In 2018, the Peak Solutions program provided a calculated 25 MW of available peak capacity savings which translates to 109,500 MWh of annual savings from January through December 2018. Load reduction and savings are summarized in Table 10 – Demand Response Program/Initiatives Load Reduction and Energy Savings 2018.

Levels of Customer Participation

Approximately 431 customers are enrolled in the program.

Evaluation/Monitoring Activities and Research Results

No evaluation activities were completed during this reporting period.

Consumer Education and Outreach

Customer program enrollment has been accomplished; outreach is primarily to customers enrolled in the program in preparation of an event.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Programs or Measures Modifications/Terminations

No program modifications were made during this reporting period.

Critical Peak Pricing – General Service and Residential

Description

Critical Peak Pricing ("CPP"), or its marketing name of Peak Event Pricing, is a DR program for both APS business (or General Service) and Residential customers in the Yuma and Phoenix metro areas utilizing manual load reduction. CPP became effective on January 1, 2010.

The program provides a price signal to incent customers to reduce their usage during events initiated by APS. CPP events will take place during June through September, weekdays between 3 p.m. and 8 p.m. (Monday through Friday), excluding holidays. Customers will be notified of an event by telephone or e-mail by 4:00 p.m. of the day prior to the CPP event. Peak Events are limited to 80 hours during the season. APS is required to initiate a minimum of six events and a maximum of 18 events.

Customers receive a kWh discount incentive off of their existing rate for all of the electricity usage during the program months of June through September.

Program Goals, Objectives and Savings Targets

The program is estimated to provide a 2018 load reduction amount of 0.39 MW. The 0.39 MW load reduction will provide 1,700 MWh of calculated annual savings. Load reduction and savings targets are summarized in Table 10 – Demand Response Program/Initiatives Load Reduction and Energy Savings 2018.

Levels of Customer Participation

Approximately 354 Residential and no business customers are enrolled in the program.

Evaluation/Monitoring Activities and Research Results

6 CPP events were called during this reporting period and resulted in an average of 1.1 kW load reduction/customer per event.

Consumer Education and Outreach

Customers in the program were emailed energy reduction tips during event periods.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Programs or Measures Modifications/Terminations

The hours that a Peak Event can take place were changed from 2–7 pm to 3–8 pm to align with current On-Peak hours. All participating customers were notified of this change via a letter sent in May 2018.

Demand Response, Energy Storage and Load Management/Rewards Initiative

The Demand Response, Energy Storage and Load Management (or 'DRESLM') initiative was approved by the Arizona Corporation Commission on August 23, 2017, in Decision No. 76314. The initiative includes emerging technologies for managing system load shapes and helping customers shift energy use to lower cost off-peak hours including battery storage, connected water heaters, and demand response with smart thermostats. It is being marketed to APS customers as the 'Rewards' initiative which includes Storage Rewards (battery storage), Reserve Rewards (connected water heaters), and Cool Rewards (smart thermostats).

Program Goals, Objectives and Savings Targets

As filed in the 2018 DSM Implementation plan, the program goal for 2018 was to achieve 13.3 MW of peak demand savings.

Table 53 - MER Adjusted Gross MW and MWh Savings - DRESLEM / Rewards Initiative

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
13.3	58,035	58,035

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

Upon program approval, APS began work to implement the initiative including conducting a comprehensive technology assessment and issuing Requests for Proposals to potential suppliers for each of the load management technologies, as well as a Distributed Energy Resource Management ('DERMs') platform to enable APS to communicate with and control these distributed energy resources.

In 2018, APS began marketing the program to customers, starting with the Cool Rewards element of the initiative in August. Marketing for the Storage Rewards element started in November 2018 and Reserve Rewards kicked off in early 2019. Participation in each program element as of the end of the reporting period is shown in the table below.

Table 54 - MER Adjusted Gross MW and MWh Savings - DRESLM/Rewards Initiative

Measure	# Participants	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Cool Rewards - Smart Thermostat Demand Response	4,121	19,013	19,013	4.3
Storage Rewards - Residential Batteries	0	0	0	0.0
Reserve Rewards - Connected Heat Pump Water Heaters	0	0	0	0.0
Intermediate Feeder Scale Batteries	3	7,314	51,200	1.7
TOTAL	**4,124**	**26,327**	**70,212**	**6.0**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Evaluation/Monitoring Activities and Research Results

Four Cool Rewards demand response events were called during this reporting period and resulted in an average of 0.82 kW load reduction/thermostat per event. This was lower than the forecasted kW per participant due to a number of reasons, including the fact that we did not conduct events in the hottest summer days of June and July due to the program kicking off in August. In 2019, APS will work with the independent evaluation contractor to evaluate program performance over a full summer season, and we anticipate higher peak demand impacts per thermostat.

For the Storage Rewards program element, 3 feeder scale batteries were installed and operating by the end of 2018. The feeder scale batteries are sized at 350 kW, 475 kW and 475 kW, providing a total energy storage capacity of 1.7 MWs including capacity reserve and line losses.

For the Reserve Rewards program element, no connected water heaters were installed or operating during the reporting period.

Consumer Education and Outreach

For the Cool Rewards element, APS worked closely with participating smart thermostat manufacturers to send out program education and outreach messages to customers through their smart thermostat displays and smart phone apps. This provided participating customers with an easy way to learn about the program and enroll directly through their smart devices. In addition, APS included information about the program on aps.com, in the August 2018 E-Newsletter, and in a direct email campaign in December 2018.

For the Storage Rewards element, education and outreach was targeted to specific APS distribution feeders where the element is being implemented.

For the Reserve Rewards element, no outreach was conducted during this reporting period. Customer education and outreach for this element of the Rewards initiative is being kicked off to customers in Q1 2019 and will be targeted to specific APS distribution feeders where this element is being implemented.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Programs or Measures Modifications/Terminations

No programs or measures were modified or terminated during this reporting period.

VII. Financing Programs

Non-Residential Energy Efficiency Financing

On January 26, 2010, the Commission issued Commission Decision No. 71460, which approved the Non-Residential Customer Repayment Financing option. The option was approved for schools, municipalities and small businesses. Commission Decision No. 72088 expanded eligibility for the financing program to include all Non-Residential customers.

APS partnered with National Bank of Arizona ("NBAZ") to offer this financing option. The Financing option was launched in May of 2010. More than half of the program trade allies have participated in financing training. The program developed educational materials for bankers, customers and trade allies to facilitate the process. In mid November 2018, NBAZ informed APS that they were discontinuing the energy efficiency loan program due to a lack of participation. On November 30, 2018, APS filed a notice of intent to discontinue the energy efficiency financing program on January 1, 2019. Non-Residential loans made in 2018 are summarized below:

Table 55 – Non-Residential Financing Programs

Category	Number of Loans	Total Loan Value	Amount in Default
Large Existing	0	$0	0
Small	0	$0	0
Schools	0	$0	0
Total	**0**	**$0**	**0**

Residential Energy Efficiency Financing

On September 1, 2010, the Commission issued Decision No. 71866, which approved the Residential Energy Efficiency Financing ("REEF") Program. Through this program, APS customers who participate in the Home Performance with ENERGY STAR® program can gain access to financing for energy efficient home improvements.

Launched in February 2011, APS partnered with NBAZ to deliver the REEF program throughout the APS territory. In mid November 2018, NBAZ informed APS that they were discontinuing the energy efficiency loan program. On November 30, 2018, APS filed a notice of intent to discontinue the energy efficiency financing program on January 1, 2019.

No customers defaulted in 2017 and APS will continue to monitor defaults closely. Residential loans are summarized below:

Table 56 – Residential Financing Programs

Category	Number of Loans	Total Loan Value
Loans issued Jan - Dec. 31, 2018	5	$39474.74
Jobs in default	0	0
Jobs deemed unrecoverable	0	0

VIII. Energy Efficiency Initiatives

APS System Savings Initiative

Description

The APS System Savings Initiative was approved by the Arizona Corporation in Decision No. 75323. The initiative is designed to save energy through energy efficiency upgrades to APS generation facilities, the transmission and distribution system, and APS owned streetlights, buildings and facilities.

Program Goals, Objectives and Savings Targets

The objective of the APS System Savings Initiative is to take advantage of opportunities for energy savings within APS generation, transmission, distribution and operations facilities. The initiative offers the potential for significant cost effective energy savings that can help lower EES compliance costs for ratepayers while meeting the energy savings objectives of the EE Standard.

Table 57 - APS System Savings Initiative Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
0.2	15,000	15,000

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

By the end of 2018, there were a total of 13 APS distribution feeders that were installed and operating with Conservation Voltage Reduction.

Evaluation/Monitoring Activities and Research Results

During the program approval process, APS worked closely with ACC Staff and independent third party evaluators to review and confirm the energy savings and cost effectiveness calculations for this initiative. As projects have been implemented, APS has used the same processes to calculate and report savings that are currently being used for similar measures in the Non-Residential Solutions for Business program. All documentation of APS System Savings projects has been provided to the independent third party evaluator for review and verification.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No programs or measures were modified or terminated during this reporting period.

Consumer Education & Outreach/Codes Support Activities

Not applicable.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross kW and kWh Savings

Table 58 - MER Adjusted Gross MW and MWh Savings - APS System Savings Initiative				
Project	**# Units**	**Annual Gross MWh Savings**	**Lifetime Gross MWh Savings**	**MW Peak Demand Savings**
Conservation Voltage Reduction	12 feeders	5,184	5,184	0.0
TOTAL	**12 feeders**	**5,184**	**5,184**	**0.0**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

Pursuant to Decision No. 75323, APS does not currently calculate net benefits or earn a performance incentive on energy savings from the APS System Savings Initiative.

Costs Incurred

There were no costs incurred for this program that are being collected through the DSMAC.

Consumer Education and Outreach

Not applicable.

Energy Codes and Appliance Standards Initiative

Description

The Energy Codes and Appliance Standards ("C&S") Initiative delivers energy savings by supporting better compliance with energy codes and appliance standards in jurisdictions throughout the APS service area by working with code officials, building professionals and other market actors to develop strategies for achieving better code compliance more cost effectively.

C&S can be one of most cost-effective ways of promoting DSM. C&S activities may be utilized to deliver low cost energy savings while supporting Arizona building officials, the construction community, customers, and stakeholders. APS supports C&S activities with a multifaceted approach that provides unbiased support, information, resources, and expertise to jurisdictions and trade allies within the APS service area.

- **Residential and Commercial Energy Codes** - Activities are intended to support building officials, the builder community, and interested stakeholders. Targeted activities include providing technical support, research, subject matter expertise, resources, and training. Training classes are customized to meet local jurisdictional needs and are based on the climate zone and code that is currently being adopted. The classes help to translate building code requirements into a process for builders to follow with subcontractors in the field to ensure that each trade knows their role in code compliance and how to properly install construction details to meet code.

Utility programs are inextricably linked to building codes and appliance standards. Utility DSM programs act as a catalyst to ready the market for new technologies or standards that are not currently common practice in the market place. By providing incentives, trade ally training and educating consumers, utility programs help to increase adoption of new energy efficient technologies and practices. Over time these practices become the commonly accepted business practice, and the market adopts higher C&S as a result. While this helps to further the goal of energy efficiency, it also has a direct impact on the available market potential for utility programs. This is due to the fact that utility program savings are calculated using current building codes and appliance standards as the "baseline" for comparison.

In general, energy savings for utility program measures are calculated by taking the efficiency differential from the baseline product (typically represented by current building codes and appliance standards) as compared to the high efficiency product being promoted by the utility program.

Program Goals, Objectives and Savings Targets

The goal of the APS Codes and Standards Initiative is to promote increased energy efficiency in the APS service territory through advancement of building codes and appliance standards, including increasing code awareness and better code compliance. Savings are quantified through independent MER evaluation. During this reporting period, energy savings are being reported resulting from codes and standards efficiency increases in Residential New Construction, Commercial New Construction, General Service Lamps, Linear Fluorescents, Motors, and HVAC.

Table 59 - Codes Initiative Goals and Objectives

Peak Demand Savings (MW)	Annual Energy Savings (MWh)	Lifetime Energy Savings (MWh)
6.9	25,988	249,983

*Based on 2018 program goals and objectives as filed in APS' Amended DSM Implemetation Plan on November 14, 2017.

Levels of Customer Participation

Participation levels are identified in APS Codes and Standards Report for 2018 issued by Navigant Consulting. This report will be submitted to the Commission in a subsequent filing.

Evaluation/Monitoring Activities and Research Results

Evaluation, monitoring, and research results are identified in APS Codes and Standards Report for 2018, as issued by Navigant Consulting. This report will be submitted to the Commission in a subsequent filing. MER activities included:

- Quantified savings due to codes and standards for single-phase HVAC equipment, motors, residential and commercial new construction, general service lamps, and linear fluorescent lamps for 2018.
- Conducted ongoing tracking and review of program participation data.
- Continued to review and update program Measure Analysis Spreadsheets and Analytic Database.

Problems Encountered and Proposed Solutions

No problems were encountered during this reporting period.

Program Modifications/Terminations

No measures were modified or terminated during this reporting period.

Consumer Education & Outreach

- Attended Central Arizona Chapter of the International Conservation Code Chapter Meetings
- Served as member of the Education Committee for AZBO
- Attended Grand Canyon International Conservation Code Chapter Meetings
- Sponsored and building science and IECC code compliance class at the AZBO Fall institute.
- Sponsored IECC 2018 EE compliance trainings directly to building officials in their offices. Will continue this practice into 2019.

Other Significant Information

No other significant information to report at this time.

MER Adjusted Gross kW and kWh Savings

Table 60 - MER Adjusted Gross MW and MWh Savings - Building Codes and Appliance Standards Initiative

Measure	Annual Gross MWh Savings	Lifetime Gross MWh Savings	MW Peak Demand Savings
Residential New Construction	2,604	52,085	1.3
Commercial New Construction	2,205	44,097	0.5
General Service Lamps	9,650	19,300	1.4
Linear Fluorescents	3,298	49,457	0.9
Motors	784	11,757	0.3
HVAC	3,509	63,165	1.9
TOTAL	**22,050**	**239,861**	**6.3**

*Savings are adjusted for line losses (Energy 7.2%, Demand 11.7%) and a capacity reserve factor of 15%.

Benefits and Net Benefits/Performance Incentive Calculation

The MER adjusted net benefits and performance incentive are provided in Tables 6 and 8.

Costs Incurred

Costs incurred for this program during this reporting period are shown in Tables 2b and 2c.

IX. Measurement Evaluation and Research

Description

Navigant Consulting provides MER Services for APS's DSM programs. These Measurement and Evaluation activities include, but are not limited to:

- Performing process evaluation research to indicate how well programs are working to achieve their objectives;
- Performing impact evaluation research to verify that energy-efficient measures are installed as expected; measure savings on installed projects to monitor the actual program savings that are achieved; and conduct research activities to refine savings and cost benefit models and identify additional opportunities for EE;
- Tracking and verifying savings measurements to monitor the actual program savings that are achieved;
- Researching additional opportunities for EE, DR and DRESLM measures and programs.
- Conducting updates and maintenance of Measure Analysis Spreadsheets and Analytic Databases for all APS programs and measures. Updates include calculation of electric energy and demand impacts, hourly end-use load-shapes, natural gas impacts, water impacts, incremental equipment costs, and operation & maintenance (O&M) cost impacts.
- Providing support for program design options to be included in the annual DSM Program Portfolio including program design, technology research, energy efficiency measure analysis, and cost-effectiveness analysis.
- Updating the Technical Reference Manual (TRM) detailing savings algorithms, performance variables, and incremental cost assumptions for new and existing measures rebated through APS DSM programs.
- Model the percentage of savings occurring during on and off peak time periods for all DSM measures to understand their contribution to mitigating Duck Curve-related issues.
- Develop a methodology and model framework to quantify the locational benefits of measures within the portfolio at the feeder or substation level, and recommend an optimally cost-effective portfolio of DER tailored to the net load at specific locations.

The approach for measurement and evaluation of the DSM programs is to integrate data collection and tracking activities directly into the program implementation process.

The APS MER Verification Report for 2018, prepared by Navigant Consulting, will be provided as a separate filing.

CERTIFICATION BY APS OF DSM ANNUAL PROGRESS REPORT FOR THE PERIOD:

JANUARY THROUGH DECEMBER 2018

Pursuant to Decision No. 67744 (April 7, 2005), I certify that to the best of my knowledge and based on the information made available to me, the DSM Annual Progress Report is complete and accurate in all material respects.

3/1/19

Date

Stacy Derstine
Vice President Customer Service and Chief Customer Officer